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INSTALLATION RESTORATION PROGRAM

Preliminary Assessment

165th Tactical Airlift Group
and the
Savannah Permanent Field Training Site
Savannah International Airport
Savannah, Georgia

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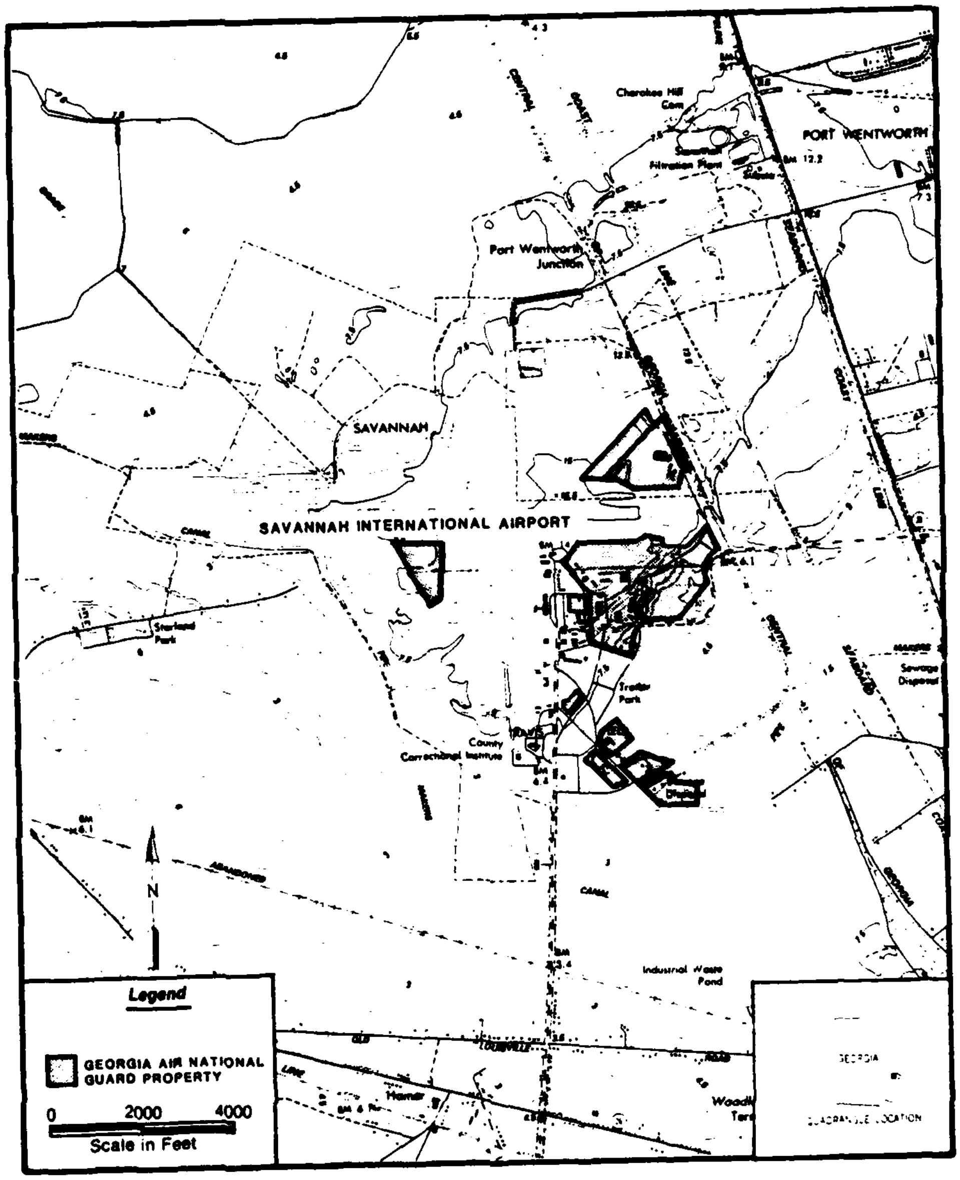
December 1987



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PRELIMINARY ASSESSMENT

FOR

165th TACTICAL AIRLIFT GROUP
AND
SAVANNAH PERMANENT FIELD TRAINING SITE
GEORGIA AIR NATIONAL GUARD
SAVANNAH INTERNATIONAL AIRPORT
SAVANNAH, GEORGIA

December 1987

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Andrews Air Force Base, Maryland

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EXECUTIVE SUMMARY

A. Introduction

The Hazardous Materials Technical Center (HMTC) was retained in May 1987 to conduct the Installation Restoration Program (IRP) Preliminary Assessment of the 165th Tactical Airlift Group (TAG) and the Savannah Permanent Field Training Site (PTFS) of the Georgia Air National Guard (ANG), Savannah International Airport, Savannah, Georgia (hereinafter referred to as the Base), under Contract No. DLA 900-83-C-4426. The Preliminary Assessment included:

- o an onsite Base visit, including interviews with 26 past and present Base employees conducted by HMTC personnel during 18-21 May 1987;
- o the acquisition and analysis of pertinent information and records on the use of hazardous material and generation and disposal of hazardous waste at the Base;
- o the acquisition and analysis of available geologic, hydrologic, meteorologic, and environmental data from pertinent Federal and State agencies; and
- o the identification of sites on the Base which may be potentially contaminated with hazardous material/hazardous waste (HM/HW).

B. Major Findings

Past Base operations involved the use and disposal of materials and wastes that subsequently were categorized as hazardous. The major operations of the Base that have used and disposed of these materials and wastes are aircraft maintenance, photo lab, aerospace ground equipment maintenance, liquid fuels management, and vehicle maintenance. These operations involve corrosion control, nondestructive inspection, fuel cell maintenance, engine maintenance, and pneudraulics. Waste oils, recovered fuels, spent cleaners, strippers, and solvents were generated by these activities.

Interviews with 26 past and present Base personnel and a field survey resulted in the identification of eight potential disposal and/or spill sites at the Base. Six of these sites are potentially contaminated with HM/HW and nine

were assigned a Hazard Assessment Score (HAS) according to the U.S. Air Force Hazard Assessment Rating Methodology (HARM). The eight sites are as follows:

Site No. 1 - PFTS Hanger/Washrack Discharge Point (HAS-78)

From 1946 to 1966, flightline spills and drainage from a hanger and washrack used by the 165th for aircraft washing and paint stripping were released, untreated, into an open storm drainage ditch. It is estimated that in excess of 40,000 gallons of paints, paint strippers, and solvents were discharged at this site.

Site No. 2 - PFTS Vehicle Maintenance Washrack Discharge Point (HAS-78)

Solvents used at the PFTS vehicle maintenance washrack have been discharged into a drainage ditch running behind the vehicle maintenance building. It was reported that since the early 1950s approximately 10,000 gallons of mineral spirits and varsol have been released at this site.

Site No. 3 - Old Plywood Factory (Unscored)

Interviewees reported that in the early 1960s a plywood finishing factory, located across from the POL facility, burned. Although some drums located there were successfully removed before they caught fire, it was reported that up to 50 drums may have burned. Interviewees were unsure of the identity of the burned chemicals, but they are thought to possibly include mineral spirits, adhesives, varnishes, and phenols.

Site No. 4 - Old Landfill Area (Unscored)

From the early 1940s until 1950, the Air Force used the area underlying and around Buildings 910 and 911 as a salvage yard and landfill area. No visible evidence of hazardous waste disposal was present at this site and interviewees did not report that the site was used for hazardous waste disposal.

Site No. 5 - Bulk Fuels Facility (HAS-75)

Numerous leaks and spills have occurred at the bulk POL tank facility. Substances released include JP-4, AVGAS, and bulk storage tank sludges. It is estimated that more than 4,000 gallons of fuel have been released at this site since it was first used in the early 1950s.

Site No. 6 - 165th Vehicle Maintenance Spill Area (HAS-65)

In the early 1960s, 5,000 gallons of JP-4 spilled from a tank truck and drained to a grass area adjacent to the 165th Motor Pool. Approximately half of the fuel was recovered.

Site No. 7 - 165th Vehicle Maintenance Washrack (HAS-78)

It is estimated that over a 30 year period, up to 10,000 gallons of PD-680 solvent may have been discharged from the 165th vehicle maintenance washrack into a nearby earthen drainage ditch.

Site No. 8 - Old 165th Aircraft Washrack (HAS-76)

From 1961 until 1983, the 165th used a washrack that discharged directly into a storm drainage ditch. It is estimated that up to 12,000 gallons of mineral spirits and trichloroethylene solvents were released into the washrack drain.

The surficial aquifer beneath the Base is composed of highly permeable sands with a high water table; therefore, it is susceptible to contamination. The aquifer may be a potable water source for nearby residents and is a recharge source for Pipemakers Canal and the Savannah River. The underlying Floridan aquifer is thought to be protected from surface contamination by an overlying clay aquiclude.

C. Conclusions

Eight areas that may be contaminated with HM/HW were initially identified on the Base. Evidence at six of the sites suggests that they may be contaminated, and that the potential for contaminant migration exists. These sites were assigned a HAS according to HARM.

Site No. 3 (Old Plywood Factory) was unscored under HARM because all hazardous materials at this location were burned when the factory burned down.

Site No. 5 (Old Landfill Area) was also unscored under HARM because there are no reports or evidence of HM/HW disposal at this site.

The most likely receptors of potential contamination from the scored sites are residents near the Base using wells that draw upon the surficial, unconfined groundwater aquifer. Base drinking water is derived from wells installed in a deeper confined aquifer that is not considered susceptible to surface con-

tamination. Some sites on the Base may also present threats to the quality of local surface water. Contaminated shallow groundwater could adversely affect surface water at points where groundwater discharges into surface streams, or surface water may be directly impacted by potential contaminants in the Base storm drainage system.

D. Recommendations

Because of the potential for contamination of ground and surface water at the Base and migration of contaminants to receptors, each of the scored sites should be further investigated in accordance with the IRP Site Investigation/ Remedial Investigation/Feasibility Study (SI/RI/FS) process. The primary purposes of the subsequent investigations are:

1. To determine whether pollutants are or are not present at each site;

2. To determine whether groundwater underlying the Base has been contaminated by the identified sites, and if so, to quantify the contaminant concentrations and rate and direction of migration, and identify the boundaries of the contaminant plume and proximity to possible receptors; and

3. To select an appropriate remedial action alternative for mitigating environmental contamination.

I. INTRODUCTION

A. Background

The Georgia Air National Guard Base at Savannah International Airport, Savannah, Georgia (hereinafter referred to as the Base), supports two separate Air Guard units: the 165th Tactical Airlift Group (TAG) and the Savannah Permanent Field Training Site (PFTS). These units were established shortly after World War II. Past operations at the Base involved the use and disposal of materials and wastes that subsequently were categorized as hazardous. Consequently, the National Guard Bureau has implemented an Installation Restoration Program (IRP), which consists of the following.

Preliminary Assessment (PA) - to identify past spill or disposal sites posing a potential and/or actual hazard to public health or the environment.

Site Investigation/Remedial Investigation/Feasibility Study (SI/RI/FS) - to acquire data via field studies for the confirmation and quantification of environmental contamination that may have an adverse impact on public health or the environment, and to select a remedial action through preparation of a feasibility study.

Research, Development, and Demonstration (RD & D) - if needed, to develop new technology for accomplishment of remediation

Remedial Design/Remedial Action (RD/RA) - to prepare designs and specifications and to implement remedial action.

B. Purpose

The purpose of this IRP Preliminary Assessment is to identify and evaluate suspected problems associated with past hazardous waste handling procedures, disposal sites, and spill sites on the Base. The Hazardous Materials Technical

Center (HMTC) visited the Base, reviewed existing environmental information, analyzed the Base records concerning the use and generation of hazardous material/hazardous waste (HM/HW), and conducted interviews with past and present Base personnel who are familiar with past and present HM/HW management activities. Relevant information collected and analyzed included the history of the Base, with special emphasis on the history of the shop operations and their past HM/HW management procedures; the local geological, hydrological, and meteorological conditions that may affect migration of contaminants; the local land use, public utilities, and zoning requirements that affect the potential for exposure to contaminants; and the ecological settings that indicate environmentally sensitive habitats or evidence of environmental stress.

C. Scope

The Scope of this Preliminary Assessment is limited to the Base and includes

- An onsite visit;
- The acquisition of pertinent information and records on hazardous materials use and hazardous waste generation and disposal practices at the Base;
- The acquisition of available geologic, hydrologic, meteorologic, land use and zoning, critical habitat, and utility data from various Federal, State, and local agencies;
- A review and analysis of all information obtained; and
- The preparation of a report to include recommendations for further actions.

The onsite visit and interviews with past and present personnel were conducted during the period 18-21 May 1987. The Preliminary Assessment was conducted by Mr. Eric A. Kuhl, Staff Scientist; Mr. Bradley Hilton, Program Manager/Civil Engineer; Ms. Janet Emry, Hydrogeologist; Mr. Mark Johnson, Geologist; and Mr. Raymond G. Clark, Jr., Department Manager/P.E. (Appendix A). Individuals from the Air National Guard who assisted in the Preliminary Assessment were Mr. Henry Lowman, Environmental Engineer (ANGSC/DEV); and selected members of the PFTS and 165th TAG. The Point of Contact (POC) at the Base was Capt. Timothy Morris, Base Civil Engineer (165 CES/DE).

D. Methodology

A flow chart of the Preliminary Assessment Methodology is presented in Figure 1. This methodology ensures a comprehensive collection and review of pertinent site specific information, and is used in the identification and assessment of potentially contaminated hazardous waste spill/disposal sites.

The Preliminary Assessment began with a site visit to the Base to identify all shop operations or activities on the installation that may have utilized hazardous material or generated hazardous waste. Next, an evaluation of past and present HM/HW handling procedures at the identified locations was made to determine whether environmental contamination may have occurred. The evaluation of past HM/HW handling practices was facilitated by extensive interviews with 26 past and present employees familiar with the various operating procedures at the Base. These interviews also defined the areas on the Base where any waste materials, either intentionally or inadvertently, may have been used, spilled, stored, disposed of, or released into the environment.

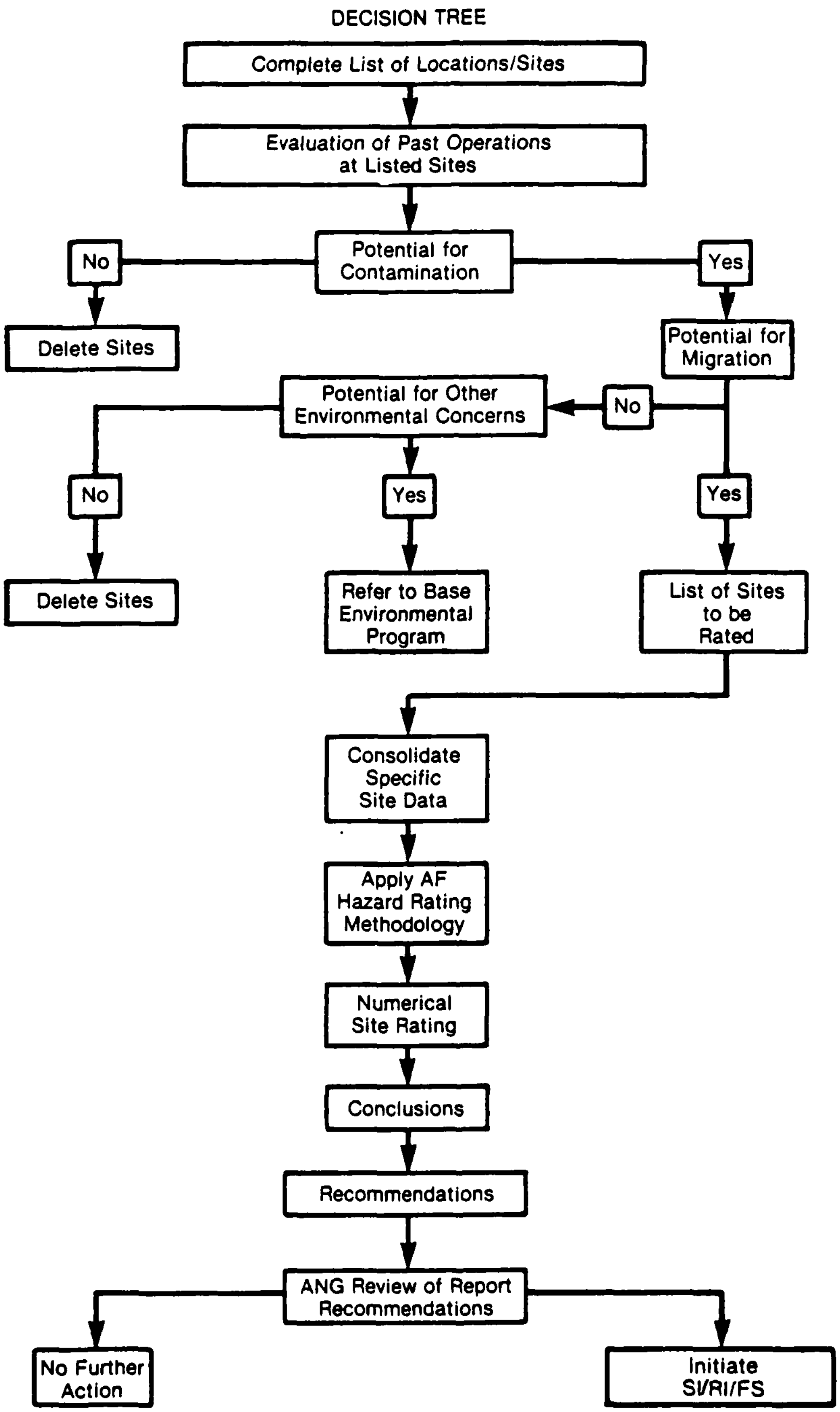
Appendix B lists the interviewees principle areas of knowledge and their years of experience with the Base. Historical records contained in the Base files were collected and reviewed to supplement the information obtained from interviews. Using the information outlined above, a list of past waste spill/disposal sites on the Base were identified for further evaluation. A general survey tour of the identified spill/disposal sites, the Base, and the surrounding area was conducted to determine the presence of visible contamination and to help the HMTC survey team assess the potential for contaminant migration. Particular attention was given to locating nearby drainage ditches, surface water bodies, residences, and wells.

Detailed geological, hydrological, meteorological, development (land use and zoning), and environmental data for the area of study was also obtained from the POC and from appropriate Federal, State, and local agencies (Appendix C). Following a detailed analysis of all the information obtained, eight areas were identified as suspect areas where HM/HW disposal may have occurred. At two sites, an old plywood factory and a general rubble and scrap disposal area,

HMTC PRELIMINARY ASSESSMENT
INSTALLATION
RESTORATION PROGRAM

Figure 1.

Preliminary Assessment Methodology Flow Chart.



no evidence could be found to substantiate HM/HW contamination. Evidence at the remaining six sites suggests that they may be contaminated and that the potential for contaminant migration exists. All of these sites were assigned a Hazard Assessment Score (HAS) using the U.S. Air Force Hazard Assessment Rating Methodology (HARM).

II. INSTALLATION DESCRIPTION

A. Location

Both the 165th TAG and the Savannah PFTS are based at the Savannah International Airport, Savannah, Georgia. The 165th TAG provides strategic and tactical airlift support on a worldwide basis. The Savannah PFTS maintains facilities for temporary accommodation and training of Air National Guard and Air Force Reserve units from throughout the country.

The Base occupies a total of 233 acres on nine separate land parcels leased from the Savannah Airport Commission. Figure 2 shows the current boundaries of the Base covered by this Preliminary Assessment.

Savannah International Airport is located in the northeast coastal region of Georgia, approximately 8 miles northwest of downtown Savannah in Chatham County. Property north and northwest of the airport is predominantly undeveloped, although a substantial amount of this land is used for agricultural and commercial forest purposes; wetlands also occupy some of this area. South of the airport is commercial activity and a limited amount of residential development. East and southeast of the airport are the Seaboard Coast and Central of Georgia railways. Further to the east is the Savannah River, 2.5 miles away. West of the airport are the cities of Pooler and Bloomingdale, an industrial park, large farms, low-density mobile home parks, and wetlands (Master Plan Report, 1983).

B. Organization and History

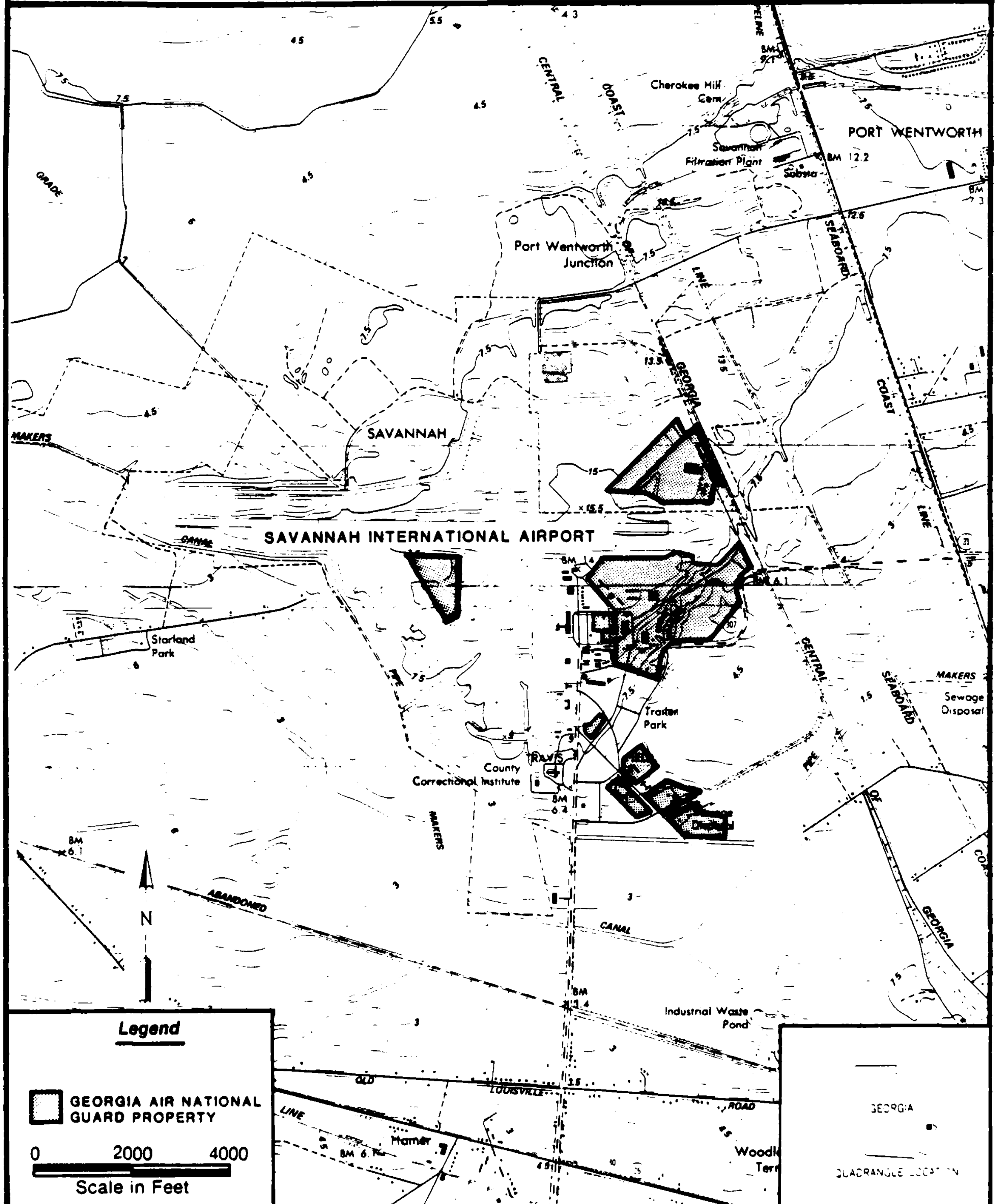
In 1942, the Federal Government leased 1,100 acres at the Savannah airport for military operations. The airport became known as Chatham Field, a command base and training station for the Second Bomb Wing of the Army Air Corps.

At the end of World War II, military development at Chatham Field ceased. Except for facilities to be used by the Air Reserve and Georgia Air National Guard, the Base was declared surplus on 18 November 1946.

Source: USGS
Port Wentworth, SC, GA,
and Garden City, GA,
7.5 Minute Series
Orthophotomaps 1980.

Figure 2.

Location Map of Georgia Air National Guard, Savannah International Airport, Savannah, Georgia.



In 1949, the Air Force proposed to establish a permanent Air Force Base at Chatham Field, and the name was changed to Chatham Air Force Base. In 1950, however, these plans were altered in favor of a permanent Air Force Base at nearby Hunter Field. On 5 July 1950, all property leased or owned by the Federal Government at Chatham Air Force Base, a total of 2,361 acres, was transferred to the city of Savannah for use as a civilian airport. At this time, the airport acquired two names. City officials designated it the Savannah Municipal Airport, and the Air National Guard units based there adopted the name Travis Field in honor of Brigadier General Robert J. Travis, of the U.S. Air Force.

Since 1950, airport expansion and construction of new facilities has continued steadily. At present, the 165th TAG has eight C-130Hs stationed at the Base (Master Plan Report, 1983). The PFTS has no aircraft permanently assigned, as units using the PFTS bring their own.

III. ENVIRONMENTAL SETTING

A. Meteorology

The climate of the Savannah area is characterized by the mild temperatures and abundant rainfall typical of coastal regions. Winters are usually short and mild, with occasional cold periods of a few days duration. Summers are long and hot, with maximum temperatures of 95° to 100° F in July and August. Average annual precipitation is 45 to 50 inches, with the summer months of June through September accounting for nearly half of the total precipitation (Counts and Donsky, 1963; Wilkes et al., 1974). By calculating net precipitation according to the method outlined in the Federal Register (47 FR 31224, dated 16 July 1982), a net precipitation value of 4.0 inches per year is obtained. Rainfall intensity, based on 1 year, 24-hour rainfall, is 3.75 inches (calculated according to 47 FR 31235, 16 July 1982, Figure 8).

B. Geology

Savannah International Airport is located in the Coastal Plain physiographic province, approximately 18 miles inland from the Atlantic Ocean. The Coastal Plain consists of a seaward-thickening accumulation of sediments overlying a basement complex of igneous and metamorphic rocks. The Coastal Plain sediments were deposited by the transgressions and regressions of the sea during late Mesozoic and Cenozoic time.

The surficial sediments at the Base consist predominantly of sands of Pliocene to Recent age, remnants of ancient barrier islands and lagoons. These unconsolidated deposits extend from the land surface to -40 to -80 feet elevation (Herrick, 1961; Counts and Donsky, 1963). Drilling logs from the city of Savannah wells Nos. 17 and 18, on airport property, indicate that the surficial sands extend to -101 feet and -63 feet elevation. Maximum hydraulic conductivity for these sands is estimated at 154 gpd/ft^2 (7.3 x 10^{-3} cm/sec) (Watson, 1979).

Underlying the unconsolidated surficial sands are Miocene-age clays and sandy clays known as the Hawthorn Formation. These clays range in thickness from 125 to 178 feet in the vicinity of Savannah International Airport (Counts and Donsky, 1963).

Below the Hawthorn Formation are several hundred feet of limestones from middle Eocene to early Miocene in age, including the Tampa and Ocala Limestones (Counts and Donsky, 1963).

C. Soils

The soils at the Base have been mapped by the U.S. Soil Conservation Service; these soils consist primarily of the Chipley-Urban land complex. This complex is 40 to 70 percent Chipley fine sandy soils and 20 to 40 percent Urban land, areas of land so altered by construction or obscured by structures that identification of the soil is difficult or impossible. The Chipley soils occur on broad sandy ridges and are moderately well drained. The surface layer of the Chipley fine sand is very dark grayish-brown to gray. The subsoil is olive brown to light yellowish-brown mottled with gray. The texture is fine sand, to a depth of 6 feet or more. Permeability of the Chipley soils is rapid (4.4×10^{-3} cm/sec to 7.1×10^{-3} cm/sec).

Small areas near the perimeter of the Base are composed of the Ogeechee-Urban land complex soils. This complex is 40 to 60 percent Ogeechee loamy fine sandy soils and 20 to 40 percent Urban land. The Ogeechee soils occur in level wet areas and are somewhat poorly drained. The surface layer of the Ogeechee soils is a very dark gray loamy fine sand, 6 to 20 inches thick. The subsoil is a dark grayish-brown sandy clay or sandy clay loam, mottled with brown. Permeability is moderately slow (4.4×10^{-4} cm/sec to 1.4×10^{-3} cm/sec).

D. Hydrology

Surface Water

Savannah International Airport is located within the drainage basin of the

Savannah River. All surface drainage from the airport is currently collected by a system of well-maintained ditches, culverts, swales, and paved canals which ultimately outfall into Pipemakers Canal south of the airport. The natural drainage system north and west of the airport also empties into Pipemakers Canal, as does treated waste from an estimated 6,500 persons and several industrial systems. Consequently, the quality of water flowing through the canal to the Savannah River is very poor (Master Plan Report, 1983). Despite this poor quality, waters of the canal do support aquatic life and the canal is fished. The city of Savannah obtains some municiple water from the Savannah River. From the intake, located approximately 6.5 miles upstream of the Base, river water is pumped to a filtration plant at Cherokee Hill, approximately 3.4 miles northeast of the airport (Counts and Donsky, 1963).

Groundwater

The primary source of potable water in the Savannah area is the Floridan aquifer, composed primarily of limestone formations such as the Ocala Limestone. The aquifer immediately threatened by contamination, however, is the unconfined surficial aquifer consisting of Pliocene to Recent-age sands. While this sandy aquifer has not been significant as a potable water source in the past, it is now being considered as an alternate water source to relieve the demand on the principal artesian aquifer. The surficial aquifer also contributes to base flow of nearby surface waters (Watson, 1979). The surficial aquifer is isolated from the deeper primary aquifer by the low permeability clays of the Hawthorn Formation, making contamination of the principal artesian aquifer from the surface unlikely (Counts and Donsky, 1963).

The Base and the majority of businesses and residents in the area receive drinking water from wells installed in the Floridan aquifer. However, local U.S. Geological Survey sources report that some residents within a mile of the airport may derive drinking water from wells drawing upon the surficial aquifer.

Groundwater in the surficial aquifer occurs at a depth of 2 to 10 feet below the land surface. Groundwater generally flows from high to low areas; at Savannah International Airport, a topographic high (51 feet elevation) exists at the intersection of two closed runways, just north of Runway 27. From this high, groundwater will flow in all directions toward lower elevations. As a result, groundwater east of the high will flow to the east, groundwater south of the high will flow to the south, and so on. Beneath Base property on the eastern portion of the Airport, groundwater flow will be predominantly to the east or southeast. Beneath the small Base parcel on the western portion of the airport, groundwater flow will be to the southwest.

E. Critical Habitats/Endangered or Threatened Species

Several wetland areas exist within 1 mile of the Savannah International Airport. The spider lily, designated as endangered by the State of Georgia, typically inhabits such wetland areas and has been observed on airport property (Master Plan Report, 1983).

Pipemakers Canal receives all surface drainage from the airport and empties into the Savannah River, 2.5 miles to the east. The Savannah River is a migratory area for the shortnose sturgeon, a federally protected species. Also located 2.5 miles east of the airport is the Savannah National Wildlife Refuge, a nesting area for the endangered bald eagle and a habitat for the threatened American alligator (U.S. Fish and Wildlife Service, 1980). Other endangered or threatened species which may inhabit the Savannah International Airport area include the eastern indigo snake, the American peregrine falcon, the Backman's warbler, the eastern brown pelican, and the red-cockaded woodpecker (U.S. Fish and Wildlife Service; 1980, Master Plan Report, 1983).

IV. SITE EVALUATION

A. Activity Review

A review of Base records and interviews with past and present Base personnel resulted in the identification of specific operations in which the majority of industrial chemicals are handled and hazardous wastes can be generated. Table 1 summarizes the major operations associated with each activity, provides estimates of the quantities of waste currently being generated by these operations, and describes the past and present disposal methods for the wastes. Based on information gathered, any operation that is not listed in Table 1 has been determined to produce negligible quantities of wastes ultimately requiring disposal.

B. Disposal/Spill Site Identification, Evaluation, and Hazard Assessment

Interviews with 26 past and present Base personnel (Appendix B) and subsequent site inspections resulted in the identification of eight waste disposal/spill sites. Six sites are potentially contaminated with HM/HW, and these sites were scored using HARM (Appendix D). Copies of completed Hazard Assessment Rating Forms are found in Appendix E, along with the criteria used to score the various rating factors. Table 2 summarizes the HAS for each of the scored sites. The final rating score reflects specific components of the hazard posed by a specific site: possible receptors of the contamination (e.g., population within a specified distance of the site and/or critical environments within a given radius of the site); the waste and its characteristics; and the potential pathways for contaminant migration (e.g., surface water, groundwater, flooding). If the evaluation indicates the site presents little or no apparent environmental or health hazard, no further IRP action will be scheduled. Figure 3 illustrates the location of the sites and brief descriptions of all the sites follow.

Table 1. Hazardous Waste Disposal Summary: Georgia Air National Guard, Savannah International Airport, Savannah, Georgia

SHOP NAME	BUILDING NO.	WASTE MATERIAL	WASTE QUANTITY (Gallons/Year)	METHODS OF TREATMENT, STORAGE, AND DISPOSAL 1950 – 1960 – 1970 – 1980 – 1987
Aircraft Maintenance (PFTS)		PD-680	50	CONTR / STRM — DRMO
		Methyl Isobutyl Ketone	6	CONTR / STRM — DRMO
		Crankcase Oil	55	CONTR / STRM — DRMO
		Synthetic Oil	150	CONTR / STRM — DRMO
		JP-4	300	FTA
		Hydraulic Fluid	25	CONTR / STRM — DRMO
Aerospace Ground Equipment (PFTS)		PD-680	50	CONTR / STRM — DRMO
		Engine Oil	150	CONTR — DRMO
		Hydraulic Oil	25-150	CONTR — DRMO
		Synthetic Oil	50	CONTR — DRMO
		Used Batteries (Lead Acid)	15 units	CONTR — DRMO
		"Nickad" Batteries	40 cells	CONTR — DRMO
		JP-4	5	FTA
		Anti-Freeze	15	STRM

CONTR - Disposed of through Hazardous Waste Contractor

DRMO - Disposed of through the Defense Reutilization and Marketing Office

FTA - Burned at Fire Training Area

GRND - Disposed of on ground

LNDFL - Landfilled offsite

NEUTR SAN - Neutralized and disposed of through sanitary sewer

OWS - Oil/Water Separator

SAN - Disposed of in drains leading to sanitary sewer

SIL REC - Sent for silver recovery offbase

SPLY - Turned into base supply for recovery

STRM - Disposed of in drains leading to storm sewer

Table 1. Hazardous Waste Disposal Summary: Georgia Air National Guard, Savannah International Airport, Savannah, Georgia (Continued)

SHOP NAME	BUILDING NO.	WASTE MATERIAL	WASTE QUANTITY (Gallons/Year)	METHODS OF TREATMENT, STORAGE, AND DISPOSAL 1950 – 1980	1980 – 1987
Vehicle Maintenance Shop (PFTS)	840	Antifreeze	200-300	STRM	
		Antifreeze	100		STRM
		Engine Oil	300-400	CONTR	DRMO
		PD-680	600	STRM	
		PD-680	180		DRMO
		Varsol	150	STRM	DRMO
		Used Batteries (Lead Acid)	25	CONTR	DRMO
		Electrolyte	30	NEUTR SAN	DRMO
		Hydraulic Fluid	100	CONTR	DRMO
Aircraft Maintenance (165th)	1924	PD-680	6,000,000	OWS	DRMO
		JP-4	100	STRM	FTA
Aerospace Ground Equipment Maintenance (165th)	1910	Engine Oil	25	STRM	DRMO
		Hydraulic Oil	20	STRM	DRMO
		Paint Strippers/Thinners	50	STRM	DRMO
		PD-680	100	STRM	DRMO
		Aircraft Cleaning Compound	100	STRM	
		Methyl Ethyl Ketone	20	STRM	
Vehicle Maintenance (165th)	1410	Engine Oil	450	CONTR	DRMO
		PD-680	1,200	STRM	OWS/CONTR
		Sulfuric Acid	25	NEUTR SAN	DRMO
		JP-4	200	GRND	FTA
		Antifreeze	110	STRM	OWS/CONTR
		Hydraulic Fluid	100	CONTR	DRMO
		Transmission Fluid	25	CONTR	DRMO
		Paint Thinner	5	CONTR	DRMO
		Brake Fluid	5		DRMO
		Grease (Bearing)	35 lbs.		OWS/CONTR

Table 1. Hazardous Waste Disposal Summary: Georgia Air National Guard, Savannah International Airport, Savannah, Georgia (Continued)

SHOP NAME	BUILDING NO.	WASTE MATERIAL	WASTE QUANTITY (Gallons/Year)	METHODS OF TREATMENT, STORAGE, AND DISPOSAL (1950 – 1960 – 1970 – 1980 – 1987)
Non-Destructive Inspection (165th)		Methyl Ethyl Ketone	100-110	1960–1980: STRM; 1980–1987: DRMO
		Penetrant	110	1960–1987: SAN
		Emulsifier	50-100	1960–1987: DRMO
		Developer	50 lbs.	1960–1987: DRMO
		Fixer	20	1960–1987: SPLY
		PD-680	110	–1987: DRMO
		Kerosene	110	1960–1987: DRMO
		Trichloroethylene	200	1960–1980: GRND / STRM
		Trichloroethane	110	1980–1987: DRMO
Weapons Maintenance Munitions Storage (165th)		Drycleaning Solvent	50	1950–1987: STRM
		Thinners/Lacquers	15	1950–1987: STRM
		Methyl Ethyl Ketone	15	1950–1987: STRM
		PD-680	100	1960–1987: STRM
Paint Shops (165th)		Solvents	15	1950–1987: OWS
		Thinners	15	1950–1987: OWS
		Paint Containers	100	1950–1987: LNDFL
Entomology (165th)		Engine Oil	15	1950–1987: OWS
		Empty Pesticide Containers	4	1950–1987: LNDFL
Plumbing Shop (165th)		Cutting Oil	2	1950–1987: OWS
Air Conditioning/ Refrigeration (165th)		Refrigeration Oil	4 pints	1950–1987: LNDFL
Battery Shop (165th)		Battery Acid	20	1950–1987: NEUTR SAN
Photo Lab (165th)		Photo Chemicals	12	1960–1987: SAN
		Xylene	4	1960–1987: SAN
		NH-5 Hypoconcentrate	25	1960–1987: SIL REC
		Acetic Acid	5	1960–1987: SAN

Table 1. Hazardous Waste Disposal Summary: Georgia Air National Guard, Savannah International Airport, Savannah, Georgia (Continued)

SHOP NAME	BUILDING NO.	WASTE MATERIAL	WASTE QUANTITY (Gallons/Year)	METHODS OF TREATMENT, STORAGE, AND DISPOSAL 1950 1960 1970 1980 1987
Fuels Management (165th)		JP-4	100-500	FTA (mid-1950s–1987)
		Sulfuric Acid	<2	NEUTR SAN (early 1980s–1987)
		Tank Cleaning Sludge	500	GRND (1950–1987)

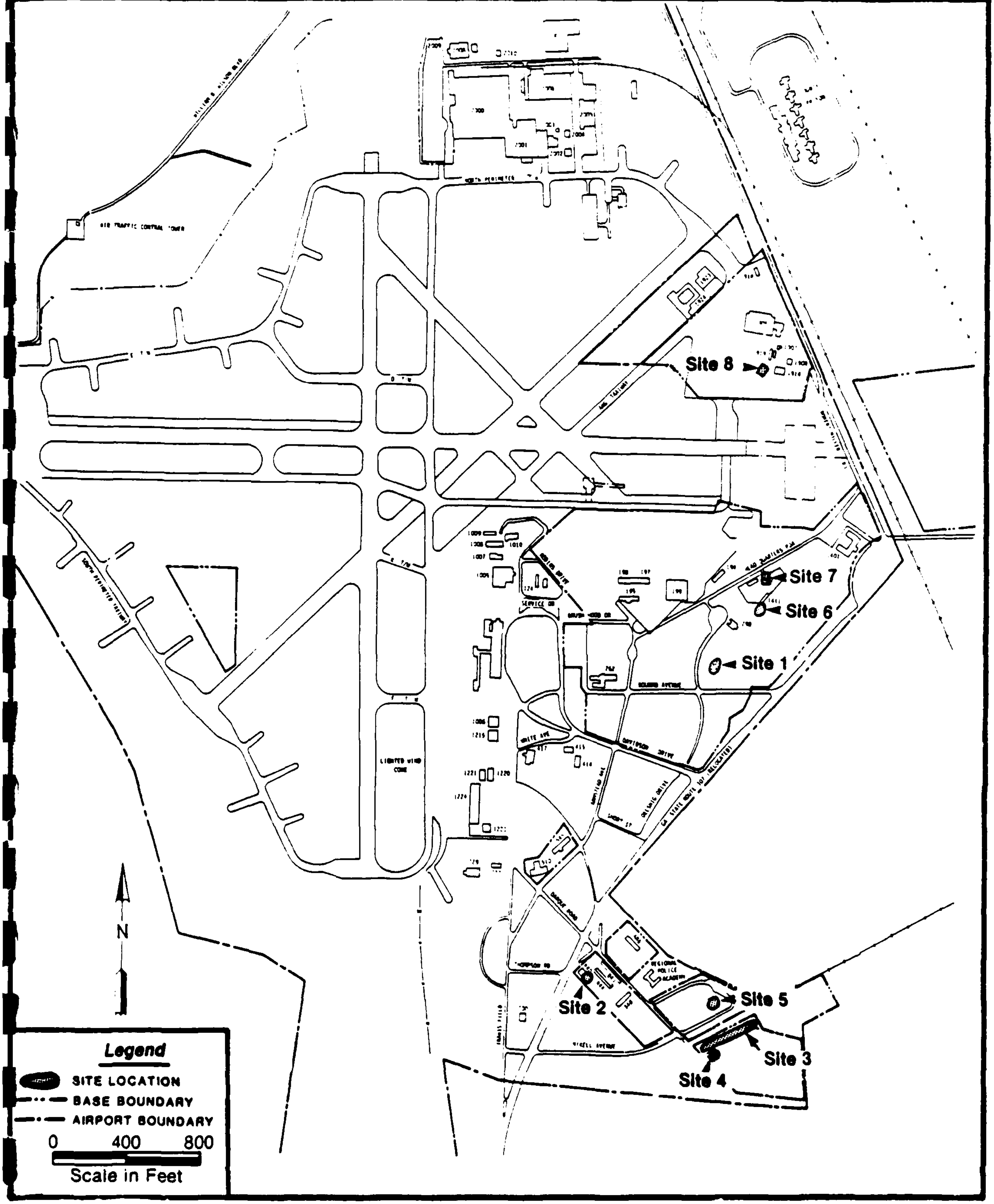
Table 2. Site Hazard Assessment Scores (as Derived from HARM): Georgia Air National Guard, Savannah International Airport, Savannah, Georgia

Site Priority	Site No.	Site Description	Receptors	Waste Characteristics	Pathway	Waste Mgmt. Practices	Overall Score
1	1	PFTS Hanger/ Washrack Dis- charge Point	66	100	68	1.0	78
2	2	PFTS Vehicle Maintenance Washrack Dis- charge Point	66	100	68	1.0	78
3	7	165th Vehicle Washrack	66	100	68	1.0	78
4	8	Old 165th Air- craft Washrack	60	100	68	1.0	76
5	5	Bulk Fuels Facility	66	90	80	0.95	75
6	6	165th Vehicle Maintenance Spill Area	66	72	68	0.95	65

HMTC Source: Gerorgia Air National Guard Base Map.

Figure 3.

Location of Sites at Georgia Air National Guard, Savannah International Airport, Savannah, Georgia.



Sites Identified at the Permanent Field Training Site

Site No. 1 - PFTS Hanger/Washrack Discharge Point (HAS-78)

From 1946 to 1966, the 165th occupied a hanger and used a washrack now used by the PFTS. Discharge from the hanger and washrack was routed to an open storm drainage channel, which subsequently discharges in Pipemakers Canal and then into the Savannah River. From 1963 to 1966, 208 F-84 aircraft were completely stripped and repainted at the hanger. Paint strippers, paint, and solvents from the F-84 refurbishment operation were routinely washed into the hanger drain for subsequent discharge at this site.

From 1953 until 1966, routine aircraft washing at the washrack resulted in the generation of up to 100 gallons of mineral spirits per day, which were released at this discharge point. It is estimated that up to 40,000 gallons of solvents, paints, and paint strippers may have been released at this discharge point during the years the washrack and hanger were used by the 165th. A large portion of the released contaminants undoubtedly migrated from the discharge point via surface water flowing into the drainage ditch; these substances are now unrecoverable. However, some portion of the released contaminants may remain sorbed in drainage ditch sediments at or near their point of discharge where they entered the environment in their most undilute form. Because such potential contamination may present threats to local surface and groundwater, a HAS was applied at this site.

Site No. 2 - PFTS Vehicle Maintenance Washrack Discharge Point (HAS-78)

This site consists of an earthen drainage ditch that receives discharge from the PFTS vehicle maintenance shop washrack. It is reported that until 1980, up to 100 gallons of varsol and 700 gallons of mineral spirits were discharged at this point yearly. Thus, since the site was initially used in the early 1950s, between 10,000 and 20,000 gallons of solvent were discharged at this point. As at Site No. 1, it is likely that a large portion of the released contaminants flowed offbase and are irretrievable. However, further IRP

work is recommended at this site to determine if some portion of contaminants remain sorbed in drainage ditch sediments at this site. A HAS was applied to quantify the relative potential hazard presented by this site.

<u>Site No. 3 - Old Plywood Factory</u> (Unscored)

Interviewees reported that a plywood finishing factory, located across from the POL facility, burned down in the early 1960s. Although some drums were successfully removed before they caught fire, it was reported that up to 50 drums may have burned. Interviewees were unsure of the identity of the spilled chemicals, but they are thought to possibly include mineral spirits, adhesives, varnishes, and phenols. All that currently remains of the plywood factory is its concrete foundation. Because all hazardous materials at this site were burned, a HAS was not applied.

<u>Site No. 4 - Old Landfill Area</u> (Unscored)

From the early 1940s until 1950, the Air Force used the area underlying and around Building Nos. 910 and 911 as a salvage yard and landfill area. Visible evidence of hazardous waste disposal was not present at this site and interviewees did not report that the site was used for hazardous waste disposal. Because there is no evidence or reports of hazardous waste disposal at this site, a HAS was not applied.

<u>Sites Identified at the 165th Tactical Airlift Group</u>

<u>Site No. 5 - Bulk Fuels Facility</u> (HAS-75)

This site was first used for bulk fuel storage in the 1940s. The tanks and associated piping were originally used to store and transport AVGAS, and later JP-4. AVGAS sludges derived from tank bottoms were previously allowed to dry on the ground within the POL facility. Five separate instances of underground pipeline leakage have been reported as a result of corrosion in the old AVGAS piping. The reported leaks were described as small pinhole leaks that allowed fuel to slowly bubble out of the piping system over a long period of time with-

out being detected. Because of the nature of the leaks, precise quantification of the amount of fuel lost from piping leakage is not possible. Although the tanks are routinely inventoried, given their large size, the expansibility of fuel, and the margin of error in measurement, fuels can leak from the tanks without being readily detected. In the early 1960s, a hole was dug near and around the POL facility piping. The hole extended to a depth of approximately 6 feet, and was described as noticeably black to the bottom and smelling of POL product.

In addition to underground piping leaks, a 4,600 gallon spill of JP-4 occurred in 1985 as a result of a faulty valve. Much of this spill entered storm drains and was discharged outside the POL facility. Base Civil Engineering personnel successfully dammed the spill flow path in nearby woods and recovered approximately 3,000 gallons of spilled fuel.

To assess potential contamination at this site, a HAS was applied.

Site No. 6 -165th Vehicle Maintenance Spill Area (HAS-65)

In the early 1960s, 5,000 gallons of JP-4 spilled from a tank truck and drained onto a grass area adjacent to the 165th Motor Pool. Approximately half of the fuel was reportedly recovered. A HAS was applied to assess potential threats to groundwater posed by this site.

Site No. 7 - 165th Vehicle Maintenance Washrack (HAS-78)

This site consists of a discharge point for a vehicle maintenance washrack. Interviewees reported that up to 30 gallons per month of PD-680 solvent was discharged through the washrack drain directly into a storm drainage ditch. The ditch eventually joins with Pipemakers Canal, which flows into the Savannah River. Over a 30-year period, it is estimated that up to 10,000 gallons of solvent may have been discharged at this site. An OWS was installed at the washrack 10 years ago, which should have reduced the volume of solvent reaching the open drainage ditch. Because contaminants, which may remain in soils and sediments at the discharge point could pose hazards to surface and groundwater, a HAS was applied.

Site No. 8 - Old 165th Aircraft Washrack (HAS-76)

From 1961 until 1983, the 165th used an aircraft washrack that discharged directly into a storm drainage ditch. In the past, a mixture of soap, water, PD-680 solvent, and trichloroethylene (and later trichloroethane) was used at the washrack to clean aircraft. Engines of the C-124 aircraft used by the 165th were known for their propensity to expel oil onto the plane. These planes were sprayed with the solvent mixture. It is estimated that approximately one plane per month was cleaned at the washrack, and approximately 40 gallons (30 gallons of PD-680 and 10 gallons of trichloroethane or trichloroethylene) of solvent mixture was used on each plane.

All waste solvent generated at the washrack either flowed into the washrack drain, or was discarded on the grass area surrounding the washrack. During the 23 years that this site was used, it is estimated that approximately 11,000 gallons of solvent were released. A HAS was applied to numerically evaluate the relative potential hazard at this site.

V. CONCLUSIONS

Information obtained through interviews with 26 past and present Base personnel, review of Base records, and field observations has resulted in the identification of eight potentially contaminated disposal and/or spill sites on Base property. These sites consist of the following:

Site No. 1 - PFTS Hanger/Washrack Discharge Point
Site No. 2 - PFTS Vehicle Maintenance Washrack Discharge Point
Site No. 3 - Old Plywood Factory
Site No. 4 - Old Landfill Area
Site No. 5 - Bulk Fuels Facility
Site No. 6 - 165th Vehicle Maintenance Spill Area
Site No. 7 - 165th Vehicle Maintenance Washrack
Site No. 8 - Old 165th Aircraft Washrack

Six of the eight sites are potentially contaminated with HM/HW, with the potential for contaminant migration to groundwater and surface water. All of these sites have been evaluated using HARM. Site No. 3 (Old Plywood Factory) and Site No. 5 (Old Landfill Area) were unscored under HARM because there are no reports or evidence of HM/HW contamination at these sites.

Because the surficial aquifer beneath the Base is composed of highly permeable sands with a high water table, the aquifer is susceptible to contamination. Nearby residents who may obtain drinking water from this aquifer would be receptors for any potential groundwater contamination. The surficial aquifer also contributes to base flow of surface waters, including Pipemakers Canal and the Savannah River; therefore, contaminated shallow groundwater may also threaten surface water. The lower Floridan aquifer, from which most of the potable water in the Savannah area is obtained, is believed to be protected from surface contamination by 125 to 180 feet of overlying clays which may act as a hydraulic barrier.

All surface drainage from the Base ultimately discharges into Pipemakers Canal and the Savannah River. Surface water quality may be adversely affected by contaminants released into the Base storm drainage system.

VI. RECOMMENDATIONS

Because of the potential for contaminant migration, initial investigative stages of the IRP SI/RI/FS are recommended for all of the scored sites identified at the Base. The following recommendations are made to ascertain if groundwater at the six scored sites has been contaminated, and to confirm or refute that Base-generated contaminants are migrating off the Base.

Site No. 1 - PTFS Hanger/Washrack Discharge Point

Further IRP analysis is required at this site to determine if contamination exists.

Site No. 2 - PTFS Vehicle Maintenance Washrack Discharge Point

Further IRP analysis is required at this site to determine if contamination exists.

Site No. 3 - Old Plywood Factory

No further IRP work is required at this site.

Site No. 4 - Old Landfill Area

No further IRP work is required at this site.

Site No. 5 - Bulk Fuels Facility

Soil contamination at this site has been confirmed. Further IRP analysis should be performed to determine the extent of soil contamination and to determine if groundwater contamination exists.

Site No. 6 - 165th Vehicle Maintenance Spill Area

Further IRP analysis is required at this site to determine if contamination

exists.

Site No. 7 - 165th Vehicle Maintenance Washrack

Further IRP analysis is required at this site to determine if contamination exists.

Site No. 8 - Old 165th Aircraft Washrack

Further IRP analysis is required at this site to determine if contamination exists.

GLOSSARY OF TERMS

AQUICLUDE - A confining bed that prevents the flow of water to or from an adjacent aquifer.

AQUIFER - A geologic formation, or group of formations, that contains sufficient saturated permeable material to conduct groundwater and to yield economically significant quantities of groundwater to wells and springs.

AQUITARD - A confining bed that retards but does not prevent the flow of water to or from an adjacent aquifer.

CONE OF DEPRESSION - A depression of the water table or potentiometric surface surrounding a discharge well which is more or less the shape of an inverted cone.

CONTAMINANT - As defined by Section 101(f)(33) of the Superfund Amendments and Reauthorization Act of 1986 (SARA) shall include, but not be limited to, any element, substance, compound, or mixture, including disease-causing agents, which after release into the environment and upon exposure, ingestion, Inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction), or physical deformation in such organisms or their offspring; except that the term "contaminant" shall not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under

(a) any substance designated pursuant to Section 311(b)(2)(A) of the Federal Water Pollution Control Act,

(b) any element, compound, mixture, solution, or substance designated pursuant to Section 102 of this Act,

(c) any hazardous waste having the characteristics identified under or listed pursuant to Section 3001 of the Solid Waste Disposal Act (but not including any waste the regulation of which under the Solid Waste Disposal Act has been suspended by Act of Congress),

(d) any toxic pollutant listed under Section 307(a) of the Federal Water Pollution Control Act,

(e) any hazardous air pollutant listed under Section 112 of the Clean Air Act, and

(f) any imminently hazardous chemical substance or mixture with respect to which the administrator has taken action pursuant to Section 7 of the Toxic Substance Control Act;

and shall not include natural gas, liquefied natural gas, or synthetic gas of pipeline quality (or mixtures of natural gas and such synthetic gas).

CRITICAL HABITAT - The specific areas within the geographical area occupied by the species, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection.

DISCHARGE - The release of any waste stream or any constituent thereof to the environment which is not recovered.

DOWNGRADIENT - A direction that is topographically or hydraulically downslope; the direction in which groundwater flows.

ENDANGERED SPECIES - Any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the secretary to constitute a pest whose protection would present an overwhelming and overriding risk to man.

GROUNDWATER - Refers to the subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated.

HARM - Hazard Assessment Rating Methodology - A system adopted and used by the United States Air Force to develop and maintain a priority listing of potentially contaminated sites on installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts. (Reference: DEQPPM 81-5, 11 December 1981).

HAS - Hazard Assessment Score - The score assigned to a site by using the U.S. Air Force Hazardous Assessment Rating Methodology (HARM).

HAZARDOUS MATERIAL - Any substance or mixture of substances having properties capable of producing adverse effects on the health and safety of the human being. Specific regulatory definitions also found in OSHA and DOT rules.

HAZARDOUS WASTE - A solid or liquid waste that, because of its quantity, concentration, or physical, chemical, or infectious characteristics may

a. cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible illness or

b. pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

HYDRAULIC CONDUCTIVITY - The rate at which water can move through a permeable medium.

HYDRAULIC GRADIENT - The difference in head (elevation of water surface) at two points divided by the distance between these two points.

MIGRATION (Contaminant) - The movement of contaminants through pathways (groundwater, surface water, soil, and air).

PERMEABILITY - The capacity of a porous rock, sediment, or soil for transmitting a fluid without impairment of the structure of the medium; it is a measure of the relative ease of fluid flow under unequal pressure.

STRATA - Distinguishable horizontal rock layers separated vertically from other layers.

SURFACE WATER - All water exposed at the ground surface, including streams, rivers, ponds, and lakes.

THREATENED SPECIES - Any species which is likely to become an endangered species within the foreseeable future throughout all or significant portion of its range.

UPGRADIENT - A direction that is topographically or hydraulically upslope.

WATER TABLE - The upper limit of the portion of the ground that is wholly saturated with water.

WETLANDS - Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

WILDERNESS AREA - An area unaffected by anthropogenic activities and deemed worthy of special attention to maintain its natural condition.

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Appendix A
Resumes of Search Team Members

ERIC A. KUHL

EDUCATION

B.A., political science/environmental policy, St. Mary's College of Maryland, 1982
Right To Know/Hazard Communication Seminar, Executive Enterprises, Inc. April 10-11, 1985
Environmental Laws and Regulations Course, Government Institutes, Inc. May 16-17, 1985
Geographic Aspects of Pollution, University of Maryland, University College, Fall 1984

EXPERIENCE

Three years of experience with on-line information systems, including analysis and summarization of legal/technical documentation pertinent to large-scale computerized litigation support projects. Regulatory experience involving research, tracking and analysis of federal and state transportation/motor carrier safety, environmental and occupational safety regulations, for eventual input into on-line data base systems. Currently conducting site investigations and preliminary assessments for the Air Force's Installation Restoration Program (IRP) and the Federal Bureau of Prisons.

EMPLOYMENT

Dynamac Corporation (1984-present): Staff Scientist

Responsibilities include site investigations, preliminary assessments, and report writing for the Phase I portion of the IRP for the Air National Guard. Also performs similar work for the Department of Justice's Federal Bureau of Prisons. Activities for these tasks entail hazardous waste site identification and assessment, and development of advisory recommendations for further site investigation. Authored the Army Materiel Command's Solvent Recovery Regulatory Impact Report, and performed regulatory analysis for DLA's used drum recycling study.

Previously, participated in the construction of an environmental regulatory information system. This task required detailed familiarization with key environmental regulations including RCRA, CERCLA, and the Hazardous Materials Transportation Act. Was also responsible for tracking relevant legislation and regulations at the federal and state levels.

Automated Sciences Group (1983-1984): Regulatory Analyst

Performed regulatory analysis of the Occupational Safety and Health Administration's regulatory dockets for the OSHA Technical Information System. Also assisted in the compilation of technical guidelines for the OSHA Technical Information System.

Aspen Systems Corporation (1982-1983): Document Analyst

Analyzed and summarized technical documents on the various aspects of nuclear power plant construction for a large-scale litigation project. Was also responsible for screening large numbers of documents to determine their relevance to the case.

PUBLICATIONS

Controversies Emerge on OSHA's Hazard Communication Standard, co-author, HMTC Update 4(4), July 1985.

Used Oil Regulation Proposed, co-author, HMTC Technical Bulletin, HMTC Update 5(4), July 1986.

AMC Solvent Study, Evaluation of Regulatory Impact on Solvent Recovery, July 1986.

BRADLEY A. HILTON

EDUCATION

B.S., civil engineering, Pennsylvania State University, 1972

CERTIFICATION

Engineer-in-Training - Pennsylvania, 1972

EXPERIENCE

Fourteen years' experience in the environmental and civil engineering fields. Responsible for the management and administration of large, complex projects related to environmental engineering and public works in the areas of hazardous waste site identification and remedial action, solid waste disposal, water and wastewater purification and treatment, and highway construction. Experience includes supervision of projects with overall responsibility for all phases of projects, from preliminary planning through design, permitting and actual construction, and participation in litigation and contract disputes (arbitration).

EMPLOYMENT

Dynamac Corporation (1986-present): Program Manager

As a program manager with the Remedial Action and Treatment Department of the Hazardous Materials Technical Center (HMTC), supervises and provides engineering management and technical guidance to professional support staff. Investigates and identifies potential hazardous waste disposal sites through onsite records searches and by conducting interviews. Rates potential hazardous waste sites utilizing the Air Force Installation Restoration Program Hazardous Assessment Rating Method (HARM) and EPA's Hazard Ranking System (HRS). Develops a statement of work for use by the client to contract for confirmation and quantification of hazardous waste sites and development of remedial action plans, and assists the client in the administration of these contracts.

Montgomery County, Maryland (1979-1986): Capital Project Coordinator

As the project manager for the development and implementation of Montgomery County's Solid Waste Disposal Program, explained the details of various solid waste disposal projects to the County Executive, County Council, senior County management, and the general public and news media; and reviewed, evaluated, and investigated concerns raised in order to resolve these concerns or justify the lack of need for concern. Established lines of communication with federal, state, regional, and local regulatory agencies, and acted as liaison with these agencies to obtain and/or defend required permits. Developed office operating budgets and CIP project descriptions, justifications, and cost estimates. Provided support to the County Attorney during

preparation for legal proceedings associated with citizen suits, contract disputes or other issues related to solid waste disposal projects, and testified on behalf of the County Government during litigation on these issues when requested or subpoenaed.

Supervised and provided engineering management and technical support in the environmental discipline and areas of contract interpretation to staff of seven professionals assigned to the $45 million short-term solid waste disposal program consisting of the planning, design and construction of a 2,000-ton/day solid waste transfer station; the design and construction of a 6-million-cubic-yard municipal solid waste sanitary landfill; the design and construction of a new road; and the planning, design, and construction of safety improvements to two existing roads. Responsibilities included the actual preparation, development, and negotiation of complex professional services contracts, construction and operating contracts, and change orders; and the supervision and approval of routine contracts and change orders developed and negotiated by project staff. Duties also included the scheduling, coordination and administration of the professional services contracts, construction contracts, and long-term operating contracts comprising the solid waste disposal program; as well as the authorization of payment requisitions and the acceptance of work performed in accordance with these contracts.

Acted as the technical director for a solid waste planning study reevaluating viable long-term solid waste disposal technologies, especially energy recovery type facilities (mass burn and RDF). Served on an interjurisdictional committee developing and awarding regional construction/operating contracts; implemented a 75,000-cubic-yard leaf composting operation; and provided County oversight of the daily operation of a regional sewerage sludge composting facility.

Fairfax County, Virginia (1975-1979): Design/Construction Coordinator

Provided liaison between the Department of Public Works and a consultant construction manager for more than $120 million of work in the overall expansion and upgrading of the County's wastewater treatment facilities to include a 36-MGD secondary and advanced treatment facility employing activated sludge; sludge incineration; flow equalization, phosphorus removal by lime precipitation, recarbonation, and recalcination, suspended solids removal by gravity filtration; organics removal by carbon adsorption; nitrogen removal by breakpoint chlorination; oxygenation; dechlorination, railroad facilities for chemical transportation and off-loading; and standby power generation and four major wastewater conveyance systems with five pump stations (6- to 50-MGD capacity), force mains and gravity sewers including approximately 4,000 feet of tunnels and an inverted syphon. Responsibilities included the overall supervision of the EPA Construction Grant Program; the preparation and updating of the Capital budgets; the preparation, negotiation, and administration of design and construction contracts; the detailed review of all facets of the design/construction activities; and meeting with regulatory agencies, concerned citizens, and the general public to explain the projects.

Washington Suburban Sanitary Commission (1972-1975): Project Manager

Supervised and coordinated the total project design efforts of the design engineers and other consultants for the upgrading and expansion of the Potomac River Water Filtration Plant and the Patuxent Water Filtration Plant. Project managerial duties included the preparation and administration of engineering contracts; the development of design and environmental assessment scopes of work; the coordination and approval of project designs, specifications, bid documents, and shop drawings; and the presentation of project designs to governmental agencies, environmental organizations, and all other concerned citizens.

Pennsylvania Department of Transportation (summers 1970-1972): Civil Engineer Trainee

Duties included assisting the resident engineer in the inspection of all phases of highway and bridge construction including the placing of bridge decks and roadway pavements.

Washington Suburban Sanitary Commission (summer 1969): Engineering Aide

As an engineering aide in the Capital Improvement Planning (CIP) Office, provided preliminary research to determine location, year required, and size and cost of future water and sewer line projects.

JANET S. EMRY

EDUCATION

M.S., geology, Old Dominion University, 1987
B.S., (cum laude), geology, James Madison University, 1983

EXPERIENCE

One year of technical experience in the fields of hydrogeology and environmental science. Experience includes the drilling and placement of wells, well monitoring, aquifer testing and determination of hydraulic properties, computer modeling of aquifer systems, field and laboratory soils analysis.

EMPLOYMENT

Dynamac Corporation (1987-present): Staff Scientist/Hydrogeologist

Responsible for providing geological and groundwater assessments of possible hazardous waste disposal/spill sites, including the determination of rates and extents of contaminant migration and computer modeling of groundwater flow and contaminant transport.

Froehling and Robertson, Inc. (1986-1987): Geologist/Engineering Technician

Performed both field and laboratory engineering soils tests.

The Nature Conservancy (1985-1986): Hydrogeologist

Investigated groundwater geology of the Nature Conservancy's Nags Head Woods Ecological Preserve in Dane County, North Carolina. Study included installing wells, monitoring water table levels, determination of hydraulic parameters through a pumping test, stratigraphic test borings, and computer modeling.

Old Dominion University (1983-1985): Teaching Assistant, Department of Geological Sciences

Taught laboratory classes in Earth Science and Historical Geology.

PROFESSIONAL AFFILIATIONS

Geological Society of America
National Water Well Association

PUBLICATION

Impact of Municipal Pumpage upon a Barrier Island Water Table, Nags Head and Kill Devil Hills, North Carolina. In: Abstracts with Programs, Geological Society of America, Vol. 19, No. 2, February 1987.

MARK D. JOHNSON

EDUCATION

B.S., geology, James Madison University, 1980

EXPERIENCE

Seven years' technical experience including geologic mapping, subsurface investigations, foundation inspections, groundwater monitoring, pumping and observation well installation, geotechnical instrumentation, groundwater assessment, preparation of Air Force Installation Restoration Program Guidance and preparation of statements of work for the Air Force and the Air National Guard.

EMPLOYMENT

Dynamac Corporation (1984-present): Staff Scientist/Geologist

Primarily responsible for preparing statements of work for Phase IV-A of the Air Force's Installation Restoration Program, statements of work for Phase II and Phase IV-A of the Air National Guard's Installation Restoration Program, and assessing groundwater of hazardous waste disposal/spill sites on military installations for the purpose of determining rates and extents of contaminant migration and for developing site investigations, remedial investigations and identifying remedial actions. Prepared management guidance document for the Air Force's Installation Restoration Program.

Bechtel Associates Professional Corporation (1981-1984): Geologist

Performed the following duties in conjunction with major civil engineering projects including subways, nuclear power plants and buildings: prepared geologic maps of surface and subsurface facilities in rock and soil including tunnels, foundations and vaults; assessed groundwater conditions in connection with construction activities and groundwater control systems; monitored the installation of permanent and temporary dewatering systems and observation wells; monitored surface and subsurface settlement of tunnels; and participated in subsurface investigations.

Schnabel Engineering Associates (1981): Geologist

Inspected foundations and backfill placement.

PROFESSIONAL AFFILIATIONS

Association of Engineering Geologists
National Water Well Association/Association of Ground Water Scientists and Engineers
British Tunneling Society

RAYMOND G. CLARK, JR.

EDUCATION

Completed graduate engineering courses, George Washington University, 1957
B.S., mechanical engineering, University of Maryland, 1949

SPECIALIZED TRAINING

Grad. European Command Military Assistance School, Stuttgart, 1969
Grad. Army Psychological Warfare School, Fort Bragg, 1963
Grad. Sanz School of Languages, D.C., 1963
Grad. DOD Military Assistance Institute, Arlington, 1963
Grad. Defense Procurement Management Course, Fort Lee, 1960
Grad. Engineer Officer's Advanced Course, Fort Belvoir, 1958

CERTIFICATIONS

Registered Professional Engineer: Kentucky (#4341); Virginia (#8303); Florida (#36228)

EXPERIENCE

Twenty-nine years of experience in engineering design, planning and management including construction and construction management, environmental, operations and maintenance, repair and utilities, research and development, electrical, mechanical, master planning and city management. Over six years' logistical experience including planning and programming of military assistance materiel and training for foreign countries, serving as liaison with American private industry, and directing materiel storage activities in an overseas area. Over two years' experience as an engineering instructor. Extensive experience in personnel management, cost reduction programs, and systems improvement.

EMPLOYMENT

<u>Dynamac Corporation (1986-present)</u>: Program Manager

Responsible for activities relating to Phases I, II and IV of the U.S. Air Force Installation Restoration Program including records search, review and evaluation of previous studies; preparation of statements of work, feasibility studies; preparation of remedial action plans, designs and specifications; review of said studies/plans to ensure that they are in conformance with requirements; review of environmental studies and reports; and preparation of Air Force Installation Restoration Program Management Guidance.

Howard Needles Tammen & Bergendoff (HNTB) (1981-1986): Manager

Responsible, as Project Manager, for: design of a new concourse complex at Miami International Airport to include terminal building, roadway system, aircraft apron, drainage channel relocation, satellite building with underground pedestrian tunnel, and associated underground utility corridors, to include subsurface aircraft fueling systems, with an estimated construction cost of $163 million; a cargo vehicle tunnel under the crosswind runway with an estimated construction cost of $15 million; design and construction of two large corporate jet aircraft hangars; and for the hydrocarbon recovery program to include investigation, analysis, design of recovery systems, monitoring of recovery systems, and planning and design of residual recovery systems utilizing biodegradation. Participated, as sub-consultant, in Air Force IRP seminar.

HNTB (1979-1981): Airport Engineer

Responsibilities included development of master plan for Iowa Air National Guard base; project initiation assistance for a new regional airport in Florida; engineering assistance for new facilities design and construction for Maryland Air National Guard; master plan for city maintenance facilities, Orlando, Florida; in-country master plan and preliminary engineering project management for Madrid, Spain, International Airport; and project management of master plan for Whiting Naval Air Station and outlying fields in Florida.

HNTB (1974-1979): Design Engineer

Responsibilities included development of feasibility and site selection studies for reliever airports in Cleveland and Atlanta; site selection and facilities requirements for the Office of Aeronautical Charting and Cartography, NOAA; and onsite mechanical and electrical engineering design for terminal improvements at Baltimore-Washington International Airport, Maryland.

HNTB (1972-1974): Airport Engineer

Responsible for development of portions of the master plan and preliminary engineering for a new international airport for Lisbon, Portugal, estimated to cost $250 million.

Self-employed (1971-1972): Private Consultant

Responsible for engineering planning and installation of a production line for multimillion-dollar contract in Madrid, Spain, to fabricate transmissions and differentials for U.S. Army vehicles.

U.S. Army, Corps of Engineers (1969-1971): Chief, Materiel & Programs

Directed materiel planning and military training programs of military assistance to the Spanish Army. Controlled arrival and acceptance of materiel by host government. Served as liaison/advisor to American industry interested

in conducting business with Spanish government. Was Engineer Advisor to Spanish Army Construction, Armament and Combat Engineers, also the Engineer Academy and Engineer School of Application.

Corps of Engineers (1968-1969): Chief, R&D Branch, OCE

Directed office responsible to Chief of Engineers for research and development. Developed research studies in new concepts of bridging, new explosives, family of construction equipment, night vision equipment, expedient airfield surfacing, expedient aircraft fueling systems, water purification equipment and policies, prefabricated buildings, etc. Achieved Department of Army acceptance for development and testing of new floating bridge. Participated in high-level Department Committee charged with development of a Tactical Gap Crossing Capability Model.

Corps of Engineers (1967-1968): Division Engineer

Facilities engineer in Korea. Was fully responsible for management and maintenance of 96 compounds within 245 square miles including 6,000+ buildings, 1 million linear feet of electrical distribution lines, 18 water purification and distribution systems, sanitary sewage disposal systems, roads, bridges, and fire protection facilities with real property value of more than $256 million. Planned and developed the first five-year master plan for this area. Administered $12 million budget and $2 million engineer supply operation. Was in responsible charge of over 500 persons. Developed and obtained approval for additional projects worth $9 million for essential maintenance and repair. Directed cost reduction programs that produced more than $500,000 savings to the United States in the first year.

Corps of Engineers (1963-1967): Engineer Advisor

Engineer and aviation advisor to the Spanish Army. Developed major modernization program for Spanish Army Engineers, including programming of modern engineer and mobile maintenance equipment. Directed U.S. portion of construction, testing and acceptance of six powder plants, one shell loading facility, an Engineer School of Application, and depot rebuild facilities for engineer, artillery, and armor equipment. Planned and developed organization of a helicopter battalion for the Spanish Army. Responsible for sales, delivery, assembly and testing of 12 new helicopters in country. Provided U.S. assistance to unit until self-sufficiency was achieved. Was U.S. advisor to Engineer Academy, School of Application and Polytechnic Institute.

Corps of Engineers (1960-1963): Deputy District Engineer

Responsible for planning and development of extensive construction projects in the Ohio River Basin for flood control and canalization, including dam, lock, bridge, and building construction, highway relocation, watershed studies, real estate acquisitions and dispositions. Was contracting officer for more than $75

million of projects per year. Supervised approximately 1,300 personnel, including 300 engineers. Planned and directed cost reduction programs amounting to more than $200,000 per year. Programmed and controlled development of a modern radio and control net in a four-state area.

Corps of Engineers (1959-1960): Area Engineer

Directed construction of a large airfield in Ohio as Contracting Officer's representative. Assured that all construction (runway, steam power plant, fuel transfer and loading facilities, utilities, buildings, etc.) complied with terms of plans and specifications. Was onsite liaison between Air Force and contractors.

Corps of Engineers (1958-1959): Chief, Supply Branch

Managed engineer supply yard containing over $21 million construction supplies and engineer equipment. Directed in-storage maintenance, processing and deprocessing of equipment. Achieved complete survey of items on hand, a new locator system and complete rewarehousing, resulting in approximately $159,000 savings in the first year.

Corps of Engineers (1957-1958): Student

U.S. Army Engineer School, Engineer Officer's Advanced Course.

Corps of Engineers (1954-1957): Engineer Manager

Managed engineer construction projects and was assigned to staff and faculty of the Engineer School. Was in charge of instruction on engineer equipment utilization, management and maintenance. Directed Electronic Section of the school. Coordinated preparation of five-year master plan for the Department of Mechanical and Technical Equipment.

Corps of Engineers (1949-1954): Engineer Commander

Positions of minor but increasing importance and responsibility in engineering management, communications, demolitions, construction administration and logistics.

PROFESSIONAL AFFILIATIONS

Member, National Society of Professional Engineers
Fellow, Society of American Military Engineers
Member, American Society of Civil Engineers
Member, Virginia Engineering Society
Member, Project Management Institute

HARDWARE

IBM PC

SOFTWARE

Lotus 1-2-3, D Base III Plus, Framework, Project Scheduler 5000, Harvard Project Manager, Volkswriter, Microsoft Project

Appendix B
Interviewee Information

List of Interview Identification Numbers

Interviewee Number	Primary Duty Assignment	Years Associated With Georgia ANG
1	Civil Engineering (165th)	2
2	Civil Engineering (PFTS)	2.5
3	Base Commander (165th)	10
4	Base Commander (PFTS)	25
5	Civil Engineering (PFTS)	8
6	Base Resources (PFTS)	8
7	Fire Protection	35
8	Fuel Distribution	22
9	Vehicle Maintenance (PFTS)	12
10	Aircraft Maintenance (PFTS)	7
11	Aircraft Maintenance (PFTS)	8
12	Aerospace Ground Equipment (PFTS)	16
13	RMS (165th)	32
14	Base Supply (165th)	34
15	Base Supply (165th)	33
16	Bioenvironmental (165th)	2
17	Nondestructive Inspection (165th)	26
18	Aircraft Maintenance (165th)	31
19	Aircraft Maintenance (165th)	12
20	Aerospace Ground Equipment (165th)	21
21	Photo Lab (165th)	32
22	Corrosion Control (165th)	8
23	Vehicle Maintenance (165th)	26
24	Aircraft Maintenance (165th)	27
25	Vehicle Maintenance (PFTS)	37
26	Aircraft Maintenance (PFTS)	34

Appendix C
Outside Agency Contact List

OUTSIDE AGENCY CONTACT LIST

1. U.S. Fish and Wildlife Service
   Washington, DC 20250

2. U.S. Soil Conservation Service
   U.S. Department of Agriculture
   Washington, DC 20250

3. U.S. Geological Survey
   12201 Sunrise Valley Drive
   Reston, Virginia 22092

Appendix D
USAF Hazard Assessment Rating Methodology

USAF HAZARD ASSESSMENT RATING METHODOLOGY

The Department of Defense (DoD) has established a comprehensive program to identify, evaluate, and control problems associated with past disposal practices at DoD facilities. One of the actions required under this program is to:

> develop and maintain a priority listing of contaminated installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts. (Reference: DEQPPM 81-5, 11 December 1981).

Accordingly, the United States Air Force (USAF) has sought to establish a system to set priorities for taking further actions at sites based upon information gathered during the Records Search phase of its Installation Restoration Program (IRP).

PURPOSE

The purpose of the site rating model is to provide a relative ranking of sites of suspected contamination from hazardous substances. This model will assist the Air National Guard in setting priorities for follow-on site investigations.

This rating system is used only after it has been determined that (1) potential for contamination exists (hazardous wastes present in sufficient quantity), and (2) potential for migration exists. A site can be deleted from consideration for rating on either basis.

DESCRIPTION OF MODEL

Like the other hazardous waste site ranking models, the U.S. Air Force's site rating model uses a scoring system to rank sites for priority attention. However, in developing this model, the designers incorporated some special features to meet specific DoD program needs.

The model uses data readily obtained during the Records Search portion (Phase I) of the IRP. Scoring judgment and computations are easily made. In assessing the hazards at a given site, the model develops a score based on the most likely routes of contamination and the worst hazards at the site. Sites are given low scores only if there are clearly no hazards. This approach meshes well with the policy for evaluating and setting restrictions on excess DoD properties.

Site scores are developed using the appropriate ranking factors according to the method presented in the flow chart (Figure 1 of this report). The site rating form and the rating factor guideline are provided at the end of this appendix.

As with the previous model, this model considers four aspects of the hazard posed by a specific site: possible receptors of the contamination, the waste and its characteristics, the potential pathways for contamination migration, and any efforts that were made to contain the wastes resulting from a spill.

The receptors category rating is based on four rating factors: the potential for human exposure to the site, the potential for human ingestion of contaminants should underlying aquifers be polluted, the current and anticipated uses of the surrounding area, and the potential for adverse effects upon important biological resources and fragile natural settings. The potential for human exposure is evaluated on the basis of the total population within 1,000 feet of the site, and the distance between the site and the base boundary. The potential for human ingestion of contaminants is based on the distance between the site and the nearest well, the groundwater use of the uppermost aquifer, and population served by the groundwater supply within 3 miles of the site. The uses of the surrounding area are determined by the zoning within a 1-mile radius. Determination of whether or not critical environments exist within a 1-mile radius of the site predicts the potential for

adverse effects from the site upon important biological resources and fragile natural settings. Each rating factor is numerically evaluated (0-3) and increased by a multiplier. The maximum possible score is also computed. The factor score and maximum possible scores are totaled, and the receptors subscore computed as follows: receptors subscore = (100 x factor score subtotal/ maximum score subtotal).

The waste characteristics category is scored in three steps. First, a point rating is assigned based on an assessment of the waste quantity and the hazard (worst case) associated with the site. The level of confidence in the information is also factored into the assessment. Next, the score is multiplied by a waste persistence factor, which acts to reduce the score if the waste is not very persistent. Finally, the score is further modified by the physical state of the waste. Liquid wastes receive the maximum score, while scores for sludges and solids are reduced.

The pathways category rating is based on evidence of contaminant migration or an evaluation of the highest potential (worst case) for contaminant migration along one of three pathways: surface-water migration, flooding, and groundwater migration. If evidence of contaminant migration exists, the category is given a subscore of 80 to 100 points. For indirect evidence, 80 points are assigned, and for direct evidence, 100 points are assigned. If no evidence is found, the highest score among the three possible routes is used. The three pathways are evaluated and the highest score among all four of the potential scores is used.

The scores for each of the three categories are added together and normalized to a maximum possible score of 100. Then the waste management practice category is scored. Scores for sites with no containment are not reduced. Scores for sites with limited containment can be reduced by 5 percent. If a site is contained and well managed, its score can be reduced by 90 percent. The final site score is calculated by applying the waste management practices category factory to the sum of the scores for the other three categories.

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE ____________________

LOCATION ____________________

DATE OF OPERATION OR OCCURRENCE ____________________

OWNER/OPERATOR ____________________

COMMENTS/DESCRIPTION ____________________

SITE RATED BY ____________________

1. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site		4		
B. Distance to nearest well		10		
C. Land use/zoning within 1 mile radius		3		
D. Distance to installation boundary		6		
E. Critical environments within 1 mile radius of site		10		
F. Water quality of nearest surface water body		6		
G. Ground water use of uppermost aquifer		9		
H. Population served by surface water supply within 3 miles downstream of site		6		
I. Population served by ground-water supply within 3 miles of site		6		
		Subtotals	____	____

Receptors subscore (100 X factor score subtotal/maximum score subtotal) ____

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) ____
2. Confidence level (C - confirmed, S - suspected) ____
3. Hazard rating (H - high, M - medium, L - low) ____

Factor Subscore A (from 20 to 100 based on factor score matrix) ____

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

____ X ____ = ____

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

____ X ____ = ____

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore ______

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water		8		
Net precipitation		6		
Surface erosion		8		
Surface permeability		6		
Rainfall intensity		8		
		Subtotals	______	______

Subscore (100 X factor score subtotal/maximum score subtotal) ______

2. Flooding

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Flooding		1		

Subscore (100 X factor score/3) ______

3. Ground water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to ground water		8		
Net precipitation		6		
Soil permeability		8		
Subsurface flows		8		
Direct access to ground water		8		
		Subtotals	______	______

Subscore (100 X factor score subtotal/maximum score subtotal) ______

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore ______

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors ______
Waste Characteristics ______
Pathways ______

Total ______ divided by 3 = ______
Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

______ X ______ = ☐

1. RECEPTORS CATEGORY

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
A. Population within 1,000 feet (includes on-base facilities)	0	1-25	26-100	Greater than 100	4
B. Distance to nearest water well	Greater than 3 miles	1 to 3 miles	3,001 feet to 1 mile	0 to 3,000 feet	10
C. Land Use/Zoning (within 1-mile radius)	Completely remote (zoning not applicable)	Agricultural	Commercial or Industrial	Residential	3
D. Distance to installation boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet	6
E. Critical environments (within 1-mile radius)	Not a critical environment	Natural areas	Pristine natural areas; minor wetlands; preserved areas; presence of economically important natural resources susceptible to contamination	Major habitat of an endangered or threatened species; presence of recharge area; major wetlands	10
F. Water quality/use designation of nearest surface water body	Agricultural or Industrial use	Recreation, propagation and management of fish and wildlife	Shellfish propagation and harvesting	Potable water supplies	6
G. Ground-water use of uppermost aquifer	Not used, other sources readily available	Commercial, industrial, or irrigation, very limited other water sources	Drinking water, municipal water available	Drinking water, no municipal water available; commercial, industrial, or irrigation, no other water source available	9
H. Population served by surface water supplies within 3 miles downstream of site	0	1-15	51-1,000	Greater than 1,000	6
I. Population served by aquifer supplies within 3 miles of site	0	1-50	51-1,000	Greater than 1,000	6

II. WASTE CHARACTERISTICS

A-1 Hazardous Waste Quantity

S = Small quantity (5 tons or 20 drums of liquid)
M = Moderate quantity (5 to 20 tons or 21 to 85 drums of liquid)
L = Large quantity (20 tons or 85 drums of liquid)

A-2 Confidence Level of Information

C = Confirmed confidence level (minimum criteria below)

- o Verbal reports from interviewer (at least 2) or written information from the records
- o Knowledge of types and quantities of wastes generated by shops and other areas on base

S = Suspected confidence level

- o No verbal reports or conflicting verbal reports and no written information from the records
- o Logic based on a knowledge of the types and quantities of hazardous wastes generated at the base, and a history of past waste disposal practices indicate that these wastes were disposed of at a site

A-3 Hazard Rating

Rating Factors	Rating Scale Levels 0	1	2	3
Toxicity	Sax's Level 0	Sax's Level 1	Sax's Level 2	Sax's Level 3
Ignitability	Flash point greater than 200°F	Flash point at 140°F to 200°F	Flash point at 80°F to 140°F	Flash point less than 80°F
Radioactivity	At or below background levels	1 to 3 times background levels	3 to 5 times background levels	Over 5 times background levels

Use the highest individual rating based on toxicity, ignitability and radioactivity and determine the hazard rating.

Hazard Rating	Points
High (H)	3
Medium (M)	2
Low (L)	1

II. WASTE CHARACTERISTICS--Continued

Waste Characteristics Matrix

Point Rating	Hazardous Waste Quantity	Confidence Level of Information	Hazard Rating
100	L	C	H
80	L	C	M
	M	C	H
70	L	S	H
60	S	C	H
	M	C	M
50	L	S	M
	L	C	L
	M	S	H
	S	C	M
40	S	S	H
	M	S	M
	M	C	L
	L	S	L
30	S	C	L
	M	S	L
	S	S	M
20	S	S	L

Notes:
For a site with more than one hazardous waste, the waste quantities may be added using the following rules:

Confidence Level
- o Confirmed confidence levels (C) can be added.
- o Suspected confidence levels (S) can be added.
- o Confirmed confidence levels cannot be added with suspected confidence levels.

Waste Hazard Rating
- o Wastes with the same hazard rating can be added.
- o Wastes with different hazard ratings can only be added in a downgrade mode, e.g., MCM + SCH = LCM if the total quantity is greater than 20 tons.

Example: Several wastes may be present at a site, each having an MCM designation (60 points). By adding the quantities of each waste, the designation may change to LCM (80 points). In this case, the correct point rating for the waste is 80.

B. Persistence Multiplier for Point Rating

Multiply Point Rating Persistence Criteria	From Part A by the Following
Metals, polycyclic compounds, and halogenated hydrocarbons	1.0
Substituted and other ring compounds	0.9
Straight chain hydrocarbons	0.8
Easily biodegradable compounds	0.4

C. Physical State Multiplier

Physical State	Multiply Point Total From Parts A and B by the Following
Liquid	1.0
Sludge	0.75
Solid	0.50

III. PATHWAYS CATEGORY

A. Evidence of Contamination

Direct evidence is obtained from laboratory analyses of hazardous contaminants present above natural background levels in surface water, ground water, or air. Evidence should confirm that the source of contamination is the site being evaluated.

Indirect evidence might be from visual observation (i.e., leachate), vegetation stress, sludge deposits, presence of taste and odors in drinking water, or reported discharges that cannot be directly confirmed as resulting from the site, but the site is greatly suspected of being a source of contamination.

B-1 Potential for Surface Water Contamination

Rating Factors	Rating Scale Levels: 0	1	2	3	Multiplier
Distance to nearest surface water (includes drainage ditches and storm sewers)	Greater than 1 mile	2,001 feet to 1 mile	501 feet to 2,000 feet	0 to 500 feet	8
Net precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater than +20 inches	6
Surface erosion	None	Slight	Moderate	Severe	8
Surface permeability	0% to 15% clay ($>10^{-2}$ cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	Greater than 50% clay ($>10^{-6}$ cm/sec)	6
Rainfall intensity based on 1-year 24-hour rainfall	<1.0 inch	1.0 to 2.0 inches	2.1 to 3.0 inches	>3.0 inches	8
(Thunderstorms)	0-5 0	6-35 30	36-49 60	>50 100	

B-2 Potential for Flooding

Rating Factors	0	1	2	3	Multiplier
Floodplain	Beyond 100-year floodplain	In 100-year floodplain	In 10-year floodplain	Floods annually	1

B-3 Potential for Ground-Water Contamination

Rating Factors	0	1	2	3	Multiplier
Depth to ground water	Greater than 500 feet	50 to 500 feet	11 to 50 feet	0 to 10 feet	8
Net precipitation	Less than -10 inches	-10 to +5 inches	+5 to + 20 inches	Greater than +20 inches	6
Soil permeability	Greater than 50% clay ($>10^{-6}$ cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	0% to 15% clay ($<10^{-2}$ cm/sec)	8

B-3 Potential for Ground-Water Contamination--Continued

Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
Subsurface flows	Bottom of site greater than 5 feet above high ground-water level	Bottom of site occasionally submerged	Bottom of site frequently submerged	Bottom of site located below mean ground-water level	8
Direct access to ground water (through faults, fractures, faulty well casings, subsidence, fissures, etc.)	No evidence of risk	Low risk	Moderate risk	High risk	8

IV. WASTE MANAGEMENT PRACTICES CATEGORY

A. This category adjusts the total risk as determined from the receptors, pathways, and waste characteristics categories for waste management practices and engineering controls designed to reduce this risk. The total risk is determined by first averaging the receptors, pathways, and waste characteristics subscores.

B. Waste Management Practices Factor

The following multipliers are then applied to the total risk points (from A):

Waste Management Practice	Multiplier
No containment	1.0
Limited containment	0.95
Fully contained and in full compliance	0.10

Guidelines for fully contained:

Landfills:

- o Clay cap or other impermeable cover
- o Leachate collection system
- o Liners in good condition
- o Adequate monitoring wells

Surface Impoundments:

- o Liners in good condition
- o Sound dikes and adequate freeboard
- o Adequate monitoring wells

Spills:

- o Quick spill cleanup action taken
- o Contaminated soil removed
- o Soil and/or water samples confirm total cleanup of the spill

Fire Protection Training Areas:

- o Concrete surface and berms
- o Oil/water separator for pretreatment of runoff
- o Effluent from oil/water separator to treatment plant

General Note: If data are not available or known to be complete the factor ratings under items I-A through I, III-B-1, or III-6-3, then leave blank for calculation of factor score and maximum possible score.

CNR122

Appendix E
Site Hazardous Assessment Rating Forms

165th Tactical Airlift Group
Georgia Air National Guard
Savannah International Airport
Savannah, Georgia

USAF Hazard Assessment Rating Methodology
Factor Rating Criteria

1. RECEPTORS

Population within 1,000 feet of site:	Over 100
Distance to nearest well:	
Site No. 1	2,000 feet
Site No. 2	2,200 feet
Site No. 5	2,800 feet
Site No. 6	2,300 feet
Site No. 7	2,500 feet
Site No. 8	3,600 feet
Land use/zoning within 1 mile radius:	Commercial/Industrial
Distance to installation boundary:	
Site No. 1	600 feet
Site No. 2	1,000 feet
Site No. 5	100 feet
Site No. 6	500 feet
Site No. 7	500 feet
Site No. 8	Less than 100 feet
Critical environments within 1 mile:	Natural areas
Water Quality of nearest surface water body:	Recreation
Groundwater use of uppermost aquifer:	Limited use for drinking water
Population served by surface water supply within 3 miles downstream of site:	None
Population served by groundwater supply within 3 miles of site:	More than 1,000

165th Tactical Airlift Group
Georgia Air National Guard
Savannah International Airport
Savannah, Georgia

USAF Hazard Assessment Rating Methodology
Factor Rating Criteria (Continued)

2. WASTE CHARACTERISTICS

Quantity and Confidence Level

Site No. 1	Over 40,000 gallons; confirmed
Site No. 2	Approximately 10,000 gallons; confirmed
Site No. 5	Over 4,000 gallons, confirmed
Site No. 6	Over 10,000 gallons; confirmed
Site No. 7	Over 10,000 gallons, confirmed
Site No. 8	Over 12,000 gallons; confirmed

Hazard Rating

Site No. 1	High
Site No. 2	High
Site No. 5	High
Site No. 6	High
Site No. 7	High
Site No. 8	High

165th Tactical Airlift Group
Georgia Air National Guard
Savannah International Airport
Savannah, Georgia

USAF Hazard Assessment Rating Methodology
Factor Rating Criteria

3. PATHWAYS

Surface Water Migration

Distance to nearest surface water:

Site No. 1	1,500 feet
Site No. 2	3,000 feet
Site No. 5	700 feet
Site No. 6	1,500 feet
Site No. 7	1,100 feet
Site No. 8	500 feet

Net precipitation:	+4.0 inches
Surface erosion	Moderate
Surface permeability:	4.4×10^{-3} to 7.1×10^{-3} cm/sec
Rainfall intensity:	3.75 inches
Flooding:	Beyond 100-year floodplain

Groundwater Migration

Depth to groundwater:	Less than 10 feet
Net precipitation:	+4.0 inches
Soil permeability:	4.4×10^{-3} to 7.1×10^{-3} cm/sec
Subsurface flow:	Occasionally submerged
Direct access to groundwater:	High risk

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE	PFTS HANGER/WASHRACK DISCHARGE POINT (SITE 1)
LOCATION	GEORGIA AIR NATIONAL GUARD, SAVANNAH, GEORGIA
DATE OF OPERATION/OCCURRENCE	1946 TO PRESENT
OWNER/OPRERATOR	SAVANNAH PFTS
COMMENTS/DESCRIPTION	
RATED BY	HMTC

I. RECEPTORS

RATING FACTOR		FACTOR RATING	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
A. POPULATION WITHIN 1000 FEET OF SITE	:	3	4	12	12
B. DISTANCE TO NEAREST WELL	:	3	10	30	30
C. LAND USE/ZONING WITHIN 1 MILE RADIUS	:	2	3	6	9
D. DISTANCE TO INSTALLATION BOUNDARY	:	3	6	18	18
E. CRITICAL ENVRONMENTS WITHIN 1 MILE RADIUS OF SITE	:	1	10	10	30
F. WATER QUALITY OF NEAREST SURFACE WATER	:	1	6	6	18
G. GROUND WATER USE OF UPPERMOST AQUIFER	:	2	9	18	27
H. POPULATION (WITHIN 3 MILES) SERVED BY					
SURFACE WATER	:	0	6	0	18
GROUND WATER	:	3	6	18	18
		SUBTOTALS		118	180

RECEPTORS SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL) 66

II. WASTE CHARACTERISTICS

A. SELECT THE FACTOR SCORE BASED ON THE ESTIMATED QUANTITY, THE DEGREE OF HAZARD, AND THE CONFIDENCE LEVEL OF THE INFORMATION.

1. WASTE QUANTITY (S=SMALL, M=MEDIUM, L=LARGE) (L)
2. CONFIDENCE LEVEL (S=SUSPECT, C=CONFIRM) (C)
3. HAZARD RATING (L=LOW, M=MEDIUM, H=HIGH) (H)

FACTOR SUBSCORE A (100)

(FROM 20 TO 100 BASED ON FACTOR SCORE MATRIX)

B. APPLY PERSISTENCE FACTOR

FACTOR SUBSCORE A x PERSISTENCE FACTOR = SUBSCORE B

(100)(1) = (100)

C. APPLY PHYSICAL STATE MULTIPLIER

SUBSCORE B x PHYSICAL STATE MULTIPLIER = WASTE CHARACTERISTICS SUBSCORE

(100)(1) = (100)

III. PATHWAY

RATING FACTOR		FACTOR RATING	MLTPLR	FACTOR SCORE	MAX. POSSIBLE SCORE

A. IF THERE IS EVIDENCE OF MIGRATION OF HAZARDOUS CONTAMINANTS, ASSIGN MAXIMUM FACTOR SUBSCORE OF <100 POINTS FOR DIRECT EVIDENCE> OR <80 POINTS FOR INDIRECT EVIDENCE>. IF DIRECT EVIDENCE <100> EXISTS THEN PROCEED TO C. IF NO EVIDENCE OR INDIRECT EVIDENCE <LESS THEN 80> EXISTS, PROCEED TO B

(0)

B. RATE THE MIGRATION POTENTIAL FOR 3 POTENTIAL PATHWAYS: SURFACE WATER MIGRATION, FLOODING, AND GROUND-WATER MIGRATION. SELECT THE HIGHERT RATING, AND PROCEED TO C.

1. SURFACE WATER MIGRATION

RATING FACTOR		FACTOR RATING	MLTPLR	FACTOR SCORE	MAX. POSSIBLE SCORE
DIST. TO NEAREST SURF. WTR.	:	2	8	16	24
NET PRECIPITATION	:	1	6	6	18
SURFACE EROSION	:	2	8	16	24
SURFACE PERMEABILITY	:	1	6	6	18
RAINFALL INTENSITY	:	0	8	0	24
SUBTOTALS				44	108
SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL)					41

2. FLOODING

		FACTOR RATING	MLTPLR	FACTOR SCORE	MAX. POSSIBLE SCORE
FLOODING		0	1	0	3
SUBSCORE (100 x FACTOR SCORE /3)	:	0			

3. GROUND WATER MIGRATION

RATING FACTOR		FACTOR RATING	MLTPLR	FACTOR SCORE	MAX. POSSIBLE SCORE
DEPTH TO GROUND WATER	:	3	8	24	24
NET PRECIPITATION	:	1	6	6	18
SOIL PERMEABILITY	:	2	8	16	24
SUBSURFACE FLOWS	:	1	8	8	24
DIRECT ACCESS TO GROUND WATER	:	3	8	24	24
SUBTOTALS				78	114
SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL)					68

C. HIGHEST PATHWAY SUBSCORE

ENTER THE HIGHEST SUBSCORE VALUE FROM A, B-1, B-2 OR B-3 ABOVE.

(68)

IV. WASTE MANAGEMENT PRACTICES

A. AVERAGE THE THREE SUBSCORES FOR RECEPTORS, WASTE CHARACTERISTICS, AND PATHWAYS.

RECEPTORS	(66)
WASTE CHARACTERISTICS	(100)
PATHWAYS	(68)
TOTAL DIVIDED BY 3 = GROSS TOTAL SCORE	(78)

B. APPLY FACTOR FOR WASTE CONTAINMENT FROM WASTE MANAGEMENT PRACTICES

GROSS TOTAL SCORE x	WASTE MANAGEMENT PRACTICES FACTOR x		FINAL SCORE
(78)	(1)	=	78

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HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE	PFTS VEHICLE MAINTENANCE WASHRACK DISCHARGE POINT (SITE 2)
LOCATION	GEORGIA AIR NATIONAL GUARD, SAVANNAH, GEORGIA
DATE OF OPERATION/OCCURRENCE	EARLY 1950s TO 1980
OWNER/OPRERATOR	SAVANNAH PFTS
COMMENTS/DESCRIPTION	
RATED BY	HMTC

I. RECEPTORS

RATING FACTOR		FACTOR RATING	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
A. POPULATION WITHIN 1000 FEET OF SITE	:	3	4	12	12
B. DISTANCE TO NEAREST WELL	:	3	10	30	30
C. LAND USE/ZONING WITHIN 1 MILE RADIUS	:	2	3	6	9
D. DISTANCE TO INSTALLATION BOUNDARY	:	3	6	18	18
E. CRITICAL ENVRONMENTS WITHIN 1 MILE RADIUS OF SITE	:	1	10	10	30
F. WATER QUALITY OF NEAREST SURFACE WATER	:	1	6	6	18
G. GROUND WATER USE OF UPPERMOST AQUIFER	:	2	9	18	27
H. POPULATION (WITHIN 3 MILES) SERVED BY					
SURFACE WATER	:	0	6	0	18
GROUND WATER	:	3	6	18	18
		SUBTOTALS		118	180

RECEPTORS SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL) 66

II. WASTE CHARACTERISTICS

A. SELECT THE FACTOR SCORE BASED ON THE ESTIMATED QUANTITY, THE DEGREE OF HAZARD, AND THE CONFIDENCE LEVEL OF THE INFORMATION.

1. WASTE QUANTITY (S=SMALL, M=MEDIUM, L=LARGE) (L)
2. CONFIDENCE LEVEL (S=SUSPECT, C=CONFIRM) (C)
3. HAZARD RATING (L=LOW, M=MEDIUM, H=HIGH) (H)

FACTOR SUBSCORE A (100)
(FROM 20 TO 100 BASED ON FACTOR SCORE MATRIX)

B. APPLY PERSISTENCE FACTOR

FACTOR SUBSCORE A x PERSISTENCE FACTOR SUBSCORE B
(100)(1) = (100)

C. APPLY PHYSICAL STATE MULTIPLIER

SUBSCORE B x PHYSICAL STATE MULTIPLIER = WASTE CHARACTERISTICS SUBSCORE
(100)(1) = (100)

III. PATHWAY

RATING FACTOR		FACTOR RATING	MLTPLR	FACTOR SCORE	MAX. POSSIBLE SCORE

A. IF THERE IS EVIDENCE OF MIGRATION OF HAZARDOUS CONTAMINANTS, ASSIGN MAXIMUM FACTOR SUBSCORE OF <100 POINTS FOR DIRECT EVIDENCE> OR <80 POINTS FOR INDIRECT EVIDENCE>. IF DIRECT EVIDENCE <100> EXISTS THEN PROCEED TO C. IF NO EVIDENCE OR INDIRECT EVIDENCE <LESS THEN 80> EXISTS, PROCEED TO B

(0)

B. RATE THE MIGRATION POTENTIAL FOR 3 POTENTIAL PATHWAYS: SURFACE WATER MIGRATION, FLOODING, AND GROUND-WATER MIGRATION. SELECT THE HIGHERT RATING, AND PROCEED TO C.

1. SURFACE WATER MIGRATION

RATING FACTOR		FACTOR RATING	MLTPLR	FACTOR SCORE	MAX. POSSIBLE SCORE
DIST. TO NEAREST SURF. WTR.	:	1	8	8	24
NET PRECIPITATION	:	1	6	6	18
SURFACE EROSION	:	2	8	16	24
SURFACE PERMEABILITY	:	1	6	6	18
RAINFALL INTENSITY	:	0	8	0	24
SUBTOTALS				36	108
SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL)					33

2. FLOODING

2. FLOODING		0	1	0	3
SUBSCORE (100 x FACTOR SCORE /3)	:	0			

3. GROUND WATER MIGRATION

RATING FACTOR		FACTOR RATING	MLTPLR	FACTOR SCORE	MAX. POSSIBLE SCORE
DEPTH TO GROUND WATER	:	3	8	24	24
NET PRECIPITATION	:	1	6	6	18
SOIL PERMEABILITY	:	2	8	16	24
SUBSURFACE FLOWS	:	1	8	8	24
DIRECT ACCESS TO GROUND WATER	:	3	8	24	24
SUBTOTALS				78	114
SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL)					68

C. HIGHEST PATHWAY SUBSCORE

ENTER THE HIGHEST SUBSCORE VALUE FROM A, B-1, B-2 OR B-3 ABOVE.

(68)

IV. WASTE MANAGEMENT PRACTICES

A. AVERAGE THE THREE SUBSCORES FOR RECEPTORS, WASTE CHARACTERISTICS, AND PATHWAYS.

RECEPTORS	(66)
WASTE CHARACTERISTICS	(100)
PATHWAYS	(68)
TOTAL DIVIDED BY 3 = GROSS TOTAL SCORE	(78)

B. APPLY FACTOR FOR WASTE CONTAINMENT FROM WASTE MANAGEMENT PRACTICES

GROSS TOTAL SCORE x	WASTE MANAGEMENT PRACTICES FACTOR x	FINAL SCORE
(78)	(1)	= 78

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HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE	BULK FUEL FACILITY (SITE 5)
LOCATION	GEORGIA AIR NATIONAL GUARD, SAVANNAH, GEORGIA
DATE OF OPERATION/OCCURRENCE	1940s TO PRESENT
OWNER/OPRERATOR	SAVANNAH 165TH TAG
COMMENTS/DESCRIPTION	
RATED BY	HMTC

I. RECEPTORS

RATING FACTOR		FACTOR RATING	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
A. POPULATION WITHIN 1000 FEET OF SITE	:	3	4	12	12
B. DISTANCE TO NEAREST WELL	:	3	10	30	30
C. LAND USE/ZONING WITHIN 1 MILE RADIUS	:	2	3	6	9
D. DISTANCE TO INSTALLATION BOUNDARY	:	3	6	18	18
E. CRITICAL ENVRONMENTS WITHIN 1 MILE RADIUS OF SITE	:	1	10	10	30
F. WATER QUALITY OF NEAREST SURFACE WATER	:	1	6	6	18
G. GROUND WATER USE OF UPPERMOST AQUIFER	:	2	9	18	27
H. POPULATION (WITHIN 3 MILES) SERVED BY					
SURFACE WATER	:	0	6	0	18
GROUND WATER	:	3	6	18	18
		SUBTOTALS		118	180

RECEPTORS SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL) 66

II. WASTE CHARACTERISTICS

A. SELECT THE FACTOR SCORE BASED ON THE ESTIMATED QUANTITY, THE DEGREE OF HAZARD, AND THE CONFIDENCE LEVEL OF THE INFORMATION.

1. WASTE QUANTITY (S=SMALL, M=MEDIUM, L=LARGE) (L)
2. CONFIDENCE LEVEL (S=SUSPECT, C=CONFIRM) (C)
3. HAZARD RATING (L=LOW, M=MEDIUM, H=HIGH) (H)

FACTOR SUBSCORE A (100)
<FROM 20 TO 100 BASED ON FACTOR SCORE MATRIX>

B. APPLY PERSISTENCE FACTOR

FACTOR SUBSCORE A	x PERSISTENCE FACTOR	=	SUBSCORE B
(100)	(0.9)	=	(90)

C. APPLY PHYSICAL STATE MULTIPLIER

SUBSCORE B	x PHYSICAL STATE MULTIPLIER	=	WASTE CHARACTERISTICS SUBSCORE
(90)	(1)	=	(90)

III. PATHWAY

RATING FACTOR		FACTOR RATING	MLTPLR	FACTOR SCORE	MAX. POSSIBLE SCORE

A. IF THERE IS EVIDENCE OF MIGRATION OF HAZARDOUS CONTAMINANTS, ASSIGN MAXIMUM FACTOR SUBSCORE OF (100 POINTS FOR DIRECT EVIDENCE) OR (80 POINTS FOR INDIRECT EVIDENCE). IF DIRECT EVIDENCE (100) EXISTS THEN PROCEED TO C. IF NO EVIDENCE OR INDIRECT EVIDENCE (LESS THEN 80) EXISTS, PROCEED TO B

(80)

B. RATE THE MIGRATION POTENTIAL FOR 3 POTENTIAL PATHWAYS: SURFACE WATER MIGRATION, FLOODING, AND GROUND-WATER MIGRATION. SELECT THE HIGHERT RATING, AND PROCEED TO C.

1. SURFACE WATER MIGRATION

DIST. TO NEAREST SURF. WTR.	:	0	8	0	24
NET PRECIPITATION	:	0	6	0	18
SURFACE EROSION	:	0	8	0	24
SURFACE PERMEABILITY	:	0	6	0	18
RAINFALL INTENSITY	:	0	8	0	24
SUBTOTALS				0	108
SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL)					0

2. FLOODING

2. FLOODING		0	1	0	3
SUBSCORE (100 x FACTOR SCORE /3)	:	0			

3. GROUND WATER MIGRATION

DEPTH TO GROUND WATER	:	0	8	0	24
NET PRECIPITATION	:	0	6	0	18
SOIL PERMEABILITY	:	0	8	0	24
SUBSURFACE FLOWS	:	0	8	0	24
DIRECT ACCESS TO GROUND WATER	:	0	8	0	24
SUBTOTALS				0	114
SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL)					0

C. HIGHEST PATHWAY SUBSCORE

ENTER THE HIGHEST SUBSCORE VALUE FROM A, B-1, B-2 OR B-3 ABOVE.

(80)

IV. WASTE MANAGEMENT PRACTICES

A. AVERAGE THE THREE SUBSCORES FOR RECEPTORS, WASTE CHARACTERISTICS, AND PATHWAYS.

RECEPTORS	(66)
WASTE CHARACTERISTICS	(90)
PATHWAYS	(80)
TOTAL DIVIDED BY 3 = GROSS TOTAL SCORE	(79)

B. APPLY FACTOR FOR WASTE CONTAINMENT FROM WASTE MANAGEMENT PRACTICES

GROSS TOTAL SCORE x	WASTE MANAGEMENT PRACTICES FACTOR x	FINAL SCORE
(79)	(0.95)	= 75

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HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE VEHICLE MAINTENANCE SPILL AREA (SITE 6)
LOCATION GEORGIA AIR NATIONAL GUARD, SAVANNAH, GEORGIA
DATE OF OPERATION/OCCURRENCE EARLY 1960s
OWNER/OPRERATOR SAVANNAH 165TH TAG
COMMENTS/DESCRIPTION
RATED BY HMTC

I. RECEPTORS

RATING FACTOR		FACTOR RATING	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
A. POPULATION WITHIN 1000 FEET OF SITE	:	3	4	12	12
B. DISTANCE TO NEAREST WELL	:	3	10	30	30
C. LAND USE/ZONING WITHIN 1 MILE RADIUS	:	2	3	6	9
D. DISTANCE TO INSTALLATION BOUNDARY	:	3	6	18	18
E. CRITICAL ENVRONMENTS WITHIN 1 MILE RADIUS OF SITE	:	1	10	10	30
F. WATER QUALITY OF NEAREST SURFACE WATER	:	1	6	6	18
G. GROUND WATER USE OF UPPERMOST AQUIFER	:	2	9	18	27
H. POPULATION (WITHIN 3 MILES) SERVED BY					
SURFACE WATER	:	0	6	0	18
GROUND WATER	:	3	6	18	18
		SUBTOTALS		118	180

RECEPTORS SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL) 66

II. WASTE CHARACTERISTICS

A. SELECT THE FACTOR SCORE BASED ON THE ESTIMATED QUANTITY, THE DEGREE OF HAZARD, AND THE CONFIDENCE LEVEL OF THE INFORMATION.

1. WASTE QUANTITY (S=SMALL, M=MEDIUM, L=LARGE) (M)
2. CONFIDENCE LEVEL (S=SUSPECT, C=CONFIRM) (C)
3. HAZARD RATING (L=LOW, M=MEDIUM, H=HIGH) (H)

FACTOR SUBSCORE A (80)
<FROM 20 TO 100 BASED ON FACTOR SCORE MATRIX>

B. APPLY PERSISTENCE FACTOR

FACTOR SUBSCORE A x PERSISTENCE FACTOR SUBSCORE B
(80)(0.9) = (72)

C. APPLY PHYSICAL STATE MULTIPLIER

SUBSCORE B x PHYSICAL STATE MULTIPLIER = WASTE CHARACTERISTICS SUBSCORE
(72)(1) = (72)

III. PATHWAY

RATING FACTOR		FACTOR RATING	MLTPLR	FACTOR SCORE	MAX. POSSIBLE SCORE

A. IF THERE IS EVIDENCE OF MIGRATION OF HAZARDOUS CONTAMINANTS, ASSIGN MAXIMUM FACTOR SUBSCORE OF <100 POINTS FOR DIRECT EVIDENCE> OR <80 POINTS FOR INDIRECT EVIDENCE>. IF DIRECT EVIDENCE <100> EXISTS THEN PROCEED TO C. IF NO EVIDENCE OR INDIRECT EVIDENCE <LESS THEN 80> EXISTS, PROCEED TO B

(0)

B. RATE THE MIGRATION POTENTIAL FOR 3 POTENTIAL PATHWAYS: SURFACE WATER MIGRATION, FLOODING, AND GROUND-WATER MIGRATION. SELECT THE HIGHERT RATING, AND PROCEED TO C.

1. SURFACE WATER MIGRATION

RATING FACTOR		FACTOR RATING	MLTPLR	FACTOR SCORE	MAX. POSSIBLE SCORE
DIST. TO NEAREST SURF. WTR.	:	2	8	16	24
NET PRECIPITATION	:	1	6	6	18
SURFACE EROSION	:	2	8	16	24
SURFACE PERMEABILITY	:	1	6	6	18
RAINFALL INTENSITY	:	0	8	0	24
SUBTOTALS				44	108
SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL)					41

2. FLOODING

FLOODING		0	1	0	3
SUBSCORE (100 x FACTOR SCORE /3)	:	0			

3. GROUND WATER MIGRATION

RATING FACTOR		FACTOR RATING	MLTPLR	FACTOR SCORE	MAX. POSSIBLE SCORE
DEPTH TO GROUND WATER	:	3	8	24	24
NET PRECIPITATION	:	1	6	6	18
SOIL PERMEABILITY	:	2	8	16	24
SUBSURFACE FLOWS	:	1	8	8	24
DIRECT ACCESS TO GROUND WATER	:	3	8	24	24
SUBTOTALS				78	114
SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL)					68

C. HIGHEST PATHWAY SUBSCORE

ENTER THE HIGHEST SUBSCORE VALUE FROM A, B-1, B-2 OR B-3 ABOVE.

(68)

IV. WASTE MANAGEMENT PRACTICES

A. AVERAGE THE THREE SUBSCORES FOR RECEPTORS, WASTE CHARACTERISTICS, AND PATHWAYS.

RECEPTORS	(66)
WASTE CHARACTERISTICS	(72)
PATHWAYS	(68)
TOTAL DIVIDED BY 3 = GROSS TOTAL SCORE	(69)

B. APPLY FACTOR FOR WASTE CONTAINMENT FROM WASTE MANAGEMENT PRACTICES

GROSS TOTAL SCORE x	WASTE MANAGEMENT PRACTICES FACTOR x		FINAL SCORE
(69)	(0.95)	=	65
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HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE 165TH VEHICLE WASHRACK (SITE 7)
LOCATION GEORGIA AIR NATIONAL GUARD, SAVANNAH, GEORGIA
DATE OF OPERATION/OCCURRENCE 1950s TO PRESENT
OWNER/OPRERATOR SAVANNAH 165TH TAG
COMMENTS/DESCRIPTION
RATED BY HMTC

I. RECEPTORS

RATING FACTOR		FACTOR RATING	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
A. POPULATION WITHIN 1000 FEET OF SITE	:	3	4	12	12
B. DISTANCE TO NEAREST WELL	:	3	10	30	30
C. LAND USE/ZONING WITHIN 1 MILE RADIUS	:	2	3	6	9
D. DISTANCE TO INSTALLATION BOUNDARY	:	3	6	18	18
E. CRITICAL ENVRONMENTS WITHIN 1 MILE RADIUS OF SITE	:	1	10	10	30
F. WATER QUALITY OF NEAREST SURFACE WATER	:	1	6	6	18
G. GROUND WATER USE OF UPPERMOST AQUIFER	:	2	9	18	27
H. POPULATION (WITHIN 3 MILES) SERVED BY					
SURFACE WATER	:	0	6	0	18
GROUND WATER	:	3	6	18	18
		SUBTOTALS		118	180

RECEPTORS SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL) 66

II. WASTE CHARACTERISTICS

A. SELECT THE FACTOR SCORE BASED ON THE ESTIMATED QUANTITY, THE DEGREE OF HAZARD, AND THE CONFIDENCE LEVEL OF THE INFORMATION.

1. WASTE QUANTITY (S=SMALL, M=MEDIUM, L=LARGE) (L)
2. CONFIDENCE LEVEL (S=SUSPECT, C=CONFIRM) (C)
3. HAZARD RATING (L=LOW, M=MEDIUM, H=HIGH) (H)

FACTOR SUBSCORE A (100)
(FROM 20 TO 100 BASED ON FACTOR SCORE MATRIX)

B. APPLY PERSISTENCE FACTOR

FACTOR SUBSCORE A x PERSISTENCE FACTOR SUBSCORE B
(100)(1) = (100)

C. APPLY PHYSICAL STATE MULTIPLIER

SUBSCORE B x PHYSICAL STATE MULTIPLIER = WASTE CHARACTERISTICS SUBSCORE
(100)(1) = (100)

III. PATHWAY

RATING FACTOR		FACTOR RATING	MLTPLR	FACTOR SCORE	MAX. POSSIBLE SCORE

A. IF THERE IS EVIDENCE OF MIGRATION OF HAZARDOUS CONTAMINANTS, ASSIGN MAXIMUM FACTOR SUBSCORE OF <100 POINTS FOR DIRECT EVIDENCE> OR <80 POINTS FOR INDIRECT EVIDENCE>. IF DIRECT EVIDENCE <100> EXISTS THEN PROCEED TO C. IF NO EVIDENCE OR INDIRECT EVIDENCE <LESS THEN 80> EXISTS, PROCEED TO B

(0)

B. RATE THE MIGRATION POTENTIAL FOR 3 POTENTIAL PATHWAYS: SURFACE WATER MIGRATION, FLOODING, AND GROUND-WATER MIGRATION. SELECT THE HIGHERT RATING, AND PROCEED TO C.

1. SURFACE WATER MIGRATION

DIST. TO NEAREST SURF. WTR.	:	2	8	16	24
NET PRECIPITATION	:	1	6	6	18
SURFACE EROSION	:	2	8	16	24
SURFACE PERMEABILITY	:	1	6	6	18
RAINFALL INTENSITY	:	0	8	0	24
SUBTOTALS				44	108
SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL)					41

2. FLOODING

FLOODING		0	1	0	3
SUBSCORE (100 x FACTOR SCORE /3)	:	0			

3. GROUND WATER MIGRATION

DEPTH TO GROUND WATER	:	3	8	24	24
NET PRECIPITATION	:	1	6	6	18
SOIL PERMEABILITY	:	2	8	16	24
SUBSURFACE FLOWS	:	1	8	8	24
DIRECT ACCESS TO GROUND WATER	:	3	8	24	24
SUBTOTALS				78	114
SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL)					68

C. HIGHEST PATHWAY SUBSCORE

ENTER THE HIGHEST SUBSCORE VALUE FROM A, B-1, B-2 OR B-3 ABOVE.

(68)

IV. WASTE MANAGEMENT PRACTICES

A. AVERAGE THE THREE SUBSCORES FOR RECEPTORS, WASTE CHARACTERISTICS, AND PATHWAYS.

RECEPTORS	(66)
WASTE CHARACTERISTICS	(100)
PATHWAYS	(68)
TOTAL DIVIDED BY 3 = GROSS TOTAL SCORE	(78)

B. APPLY FACTOR FOR WASTE CONTAINMENT FROM WASTE MANAGEMENT PRACTICES

GROSS TOTAL SCORE x	WASTE MANAGEMENT PRACTICES FACTOR x	FINAL SCORE
(78)	(1)	= 78

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HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE OLD 165TH AIRCRAFT WASHRACK (SITE 8)
LOCATION GEORGIA AIR NATIONAL GUARD, SAVANNAH, GEORGIA
DATE OF OPERATION/OCCURRENCE 1961 TO 1983
OWNER/OPRERATOR SAVANNAH 165TH TAG
COMMENTS/DESCRIPTION
RATED BY HMTC

I. RECEPTORS

RATING FACTOR		FACTOR RATING	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
A. POPULATION WITHIN 1000 FEET OF SITE	:	3	4	12	12
B. DISTANCE TO NEAREST WELL	:	2	10	20	30
C. LAND USE/ZONING WITHIN 1 MILE RADIUS	:	2	3	6	9
D. DISTANCE TO INSTALLATION BOUNDARY	:	3	6	18	18
E. CRITICAL ENVRONMENTS WITHIN 1 MILE RADIUS OF SITE	:	1	10	10	30
F. WATER QUALITY OF NEAREST SURFACE WATER	:	1	6	6	18
G. GROUND WATER USE OF UPPERMOST AQUIFER	:	2	9	18	27
H. POPULATION (WITHIN 3 MILES) SERVED BY					
SURFACE WATER	:	0	6	0	18
GROUND WATER	:	3	6	18	18
		SUBTOTALS		108	180

RECEPTORS SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL) 60

II. WASTE CHARACTERISTICS

A. SELECT THE FACTOR SCORE BASED ON THE ESTIMATED QUANTITY, THE DEGREE OF HAZARD, AND THE CONFIDENCE LEVEL OF THE INFORMATION.

1. WASTE QUANTITY (S=SMALL, M=MEDIUM, L=LARGE) (L)
2. CONFIDENCE LEVEL (S=SUSPECT, C=CONFIRM) (C)
3. HAZARD RATING (L=LOW, M=MEDIUM, H=HIGH) (H)

FACTOR SUBSCORE A (100)
(FROM 20 TO 100 BASED ON FACTOR SCORE MATRIX)

B. APPLY PERSISTENCE FACTOR

FACTOR SUBSCORE A x PERSISTENCE FACTOR = SUBSCORE B
(100)(1) = (100)

C. APPLY PHYSICAL STATE MULTIPLIER

SUBSCORE B x PHYSICAL STATE MULTIPLIER = WASTE CHARACTERISTICS SUBSCORE
(100)(1) = (100)

III. PATHWAY

RATING FACTOR		FACTOR RATING	MLTPLR	FACTOR SCORE	MAX. POSSIBLE SCORE

A. IF THERE IS EVIDENCE OF MIGRATION OF HAZARDOUS CONTAMINANTS, ASSIGN MAXIMUM FACTOR SUBSCORE OF (100 POINTS FOR DIRECT EVIDENCE) OR (80 POINTS FOR INDIRECT EVIDENCE). IF DIRECT EVIDENCE (100) EXISTS THEN PROCEED TO C. IF NO EVIDENCE OR INDIRECT EVIDENCE (LESS THEN 80) EXISTS, PROCEED TO B
(0)

B. RATE THE MIGRATION POTENTIAL FOR 3 POTENTIAL PATHWAYS: SURFACE WATER MIGRATION, FLOODING, AND GROUND-WATER MIGRATION. SELECT THE HIGHERT RATING, AND PROCEED TO C.

1. SURFACE WATER MIGRATION

DIST. TO NEAREST SURF. WTR.	:	3	8	24	24
NET PRECIPITATION	:	1	6	6	18
SURFACE EROSION	:	2	8	16	24
SURFACE PERMEABILITY	:	1	6	6	18
RAINFALL INTENSITY	:	0	8	0	24
SUBTOTALS				52	108
SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL)					48

2. FLOODING

2. FLOODING		0	1	0	3
SUBSCORE (100 x FACTOR SCORE /3)	:	0			

3. GROUND WATER MIGRATION

DEPTH TO GROUND WATER	:	3	8	24	24
NET PRECIPITATION	:	1	6	6	18
SOIL PERMEABILITY	:	2	8	16	24
SUBSURFACE FLOWS	:	1	8	8	24
DIRECT ACCESS TO GROUND WATER	:	3	8	24	24
SUBTOTALS				78	114
SUBSCORE (100 x FACTOR SCORE SUBTOTAL/MAXIMUM SCORE SUBTOTAL)					68

C. HIGHEST PATHWAY SUBSCORE

ENTER THE HIGHEST SUBSCORE VALUE FROM A, B-1, B-2 OR B-3 ABOVE.
(68)

IV. WASTE MANAGEMENT PRACTICES

A. AVERAGE THE THREE SUBSCORES FOR RECEPTORS, WASTE CHARACTERISTICS, AND PATHWAYS.

RECEPTORS	(60)
WASTE CHARACTERISTICS	(100)
PATHWAYS	(68)
TOTAL DIVIDED BY 3 = GROSS TOTAL SCORE	(76)

B. APPLY FACTOR FOR WASTE CONTAINMENT FROM WASTE MANAGEMENT PRACTICES

GROSS TOTAL SCORE x	WASTE MANAGEMENT PRACTICES FACTOR x		FINAL SCORE
(76)	(1)	=	76